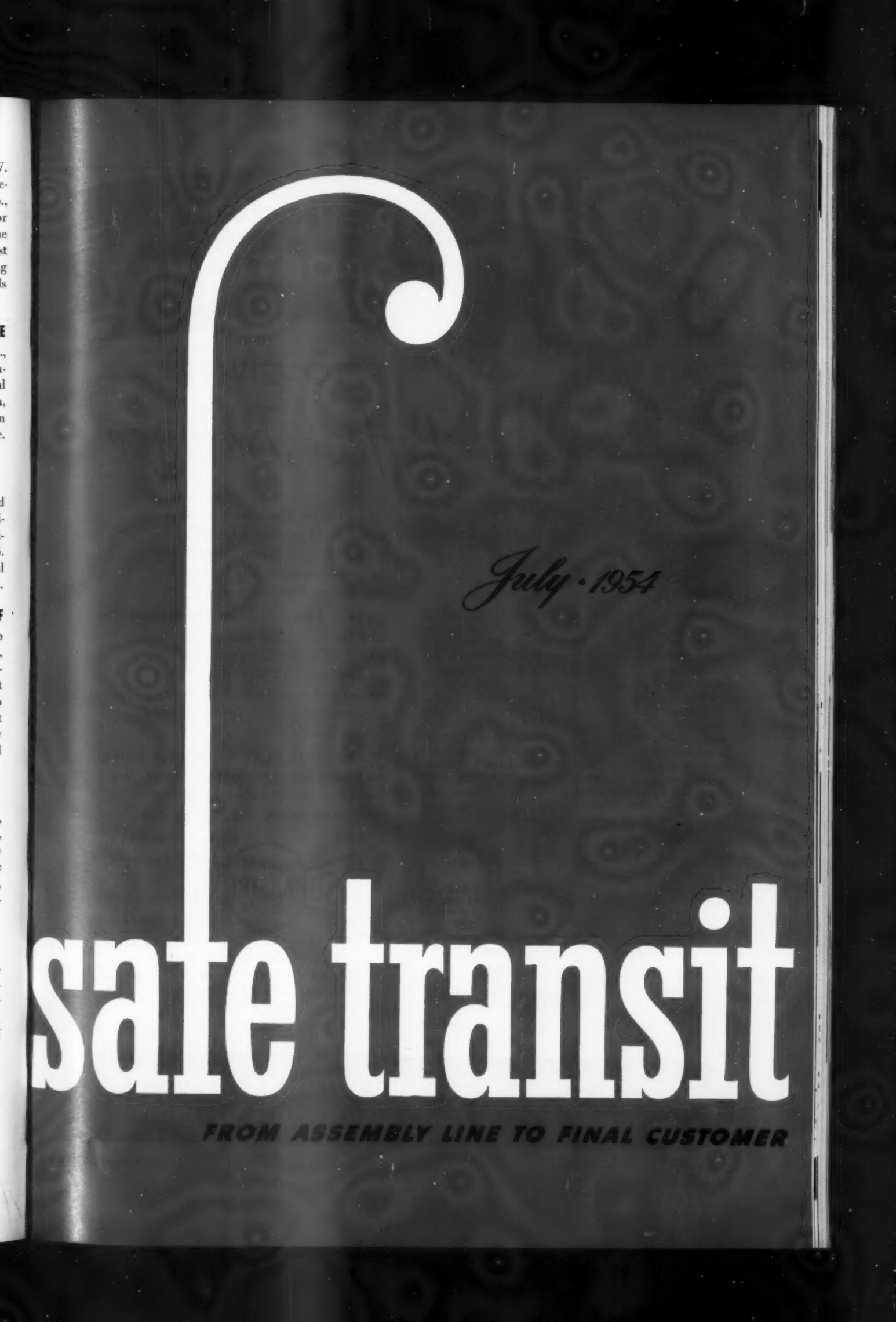
July • 1954
safe transit
FROM ASSEMBLY LINE TO FINAL CUSTOMER

PERFECTLY PROPORTIONED

TO GIVE *Perfect Balance*

There quite obviously must be some good reason why SUPERSTRONG shipping containers have been among the leaders for nearly one hundred years.

Careful design and manufacture are important factors. Every SUPERSTRONG box or crate is proportioned to give the perfect balance of materials which makes for greatest possible protection at lowest possible cost.

We ask that SUPERSTRONG be given your consideration when next the question of shipping containers arises.

SHIPPING TRADE MARK SUPERSTRONG CONTAINERS REG. U.S. PAT. OFF.

WIREBOUND BOXES and CRATES
WOODEN BOXES and CRATES
CORRUGATED FIBRE BOXES
BEVERAGE CASES
STARCH TRAYS · · · PALLETS

RATHBORNE, HAIR and RIDGWAY BOX CO.
1440 WEST 21st PLACE • CHICAGO 8, ILLINOIS

ST-2

JULY • 1954 finish

safe transit

A monthly trade publication section devoted to improved packaging and shipping and materials handling practices in the home appliance and metal products manufacturing field.

Plant experience information for all executives and plant men interested in the problem of packaging and shipping improvement and loss prevention.

Complete information on the National Safe Transit pre-shipment testing program for packaged finished products, and detailed progress reports of divisions and sub-committees of the National Safe Transit Committee.

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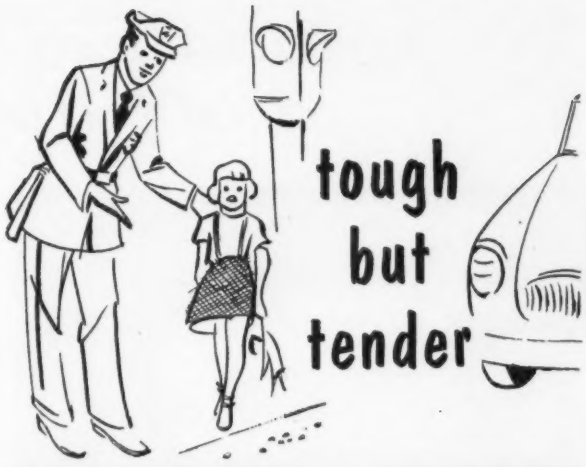

cush-on-strap

CUSH-ON-STRAP *is the only padded strapping for protective packing of appliances and other finished metal and wood products.*

CUSH-ON-STRAP has giant strength — yet will not stain or mar the finest finishes . . . eliminates shipping damage such as broken catches, hinges, drawer tracks, etc., preventing costly replacements. CUSH-ON-STRAP is tailored for each job. While it is supplied continuous on fibre throw-away reels, the lengths are predetermined with the metal scored for ease in breaking. Standard steel tensioners and sealers may be used, for at each end of a length 6" of metal is free from padding. Saves you money . . . CUSH-ON-STRAP eliminates waste, ends fussy pre-assembly, is applied faster and with less labor. CUSH-ON-STRAP in one product, (steel padded with fluffy cellulose) is a means of strapping everything from automotive finished parts to x-ray equipment, and from household furniture to office equipment. Mail the convenient coupon for full particulars today.

USE THE COUPON to learn how we can serve you in the packing and shipping of your products.

SACKNER PRODUCTS
900 Ottawa Ave., N. W.
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How can CUSH-ON-STRAP lower our shipping and packing costs?

☐ Our products are.....

.....

☐ Please have your Packaging Engineer demonstrate the advantages of CUSH-ON-STRAP.

Firm Name .....

Address .....

By..... Title.....

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900 Ottawa Avenue, N.W.
GRAND RAPIDS 2, MICHIGAN

Amana gets a problem off its chest

HOT OFF THE LINE, this Amana Food Freezer, now the pride of its maker, will soon be the pride of some home-owner. Problem was to get it to the new owners as flawless as when it left the factory. The sensible solution was to consult a packaging authority in this field for recommendations. That's when Atlas Plywood was called in.

READY TO TRAVEL. Atlas Plywood engineers designed a plywood container that would withstand bumps en route, in warehouse handling and in dealer delivery. Distributors praised the case because it provided full protection and relieved the headache of damage claims. Amana now packages its entire production in Atlas Plywood containers.

Can *your* shipping costs be cut?

Let's try. No charge if they can't. Big savings if they can. Ship us your products in their present containers. Then —

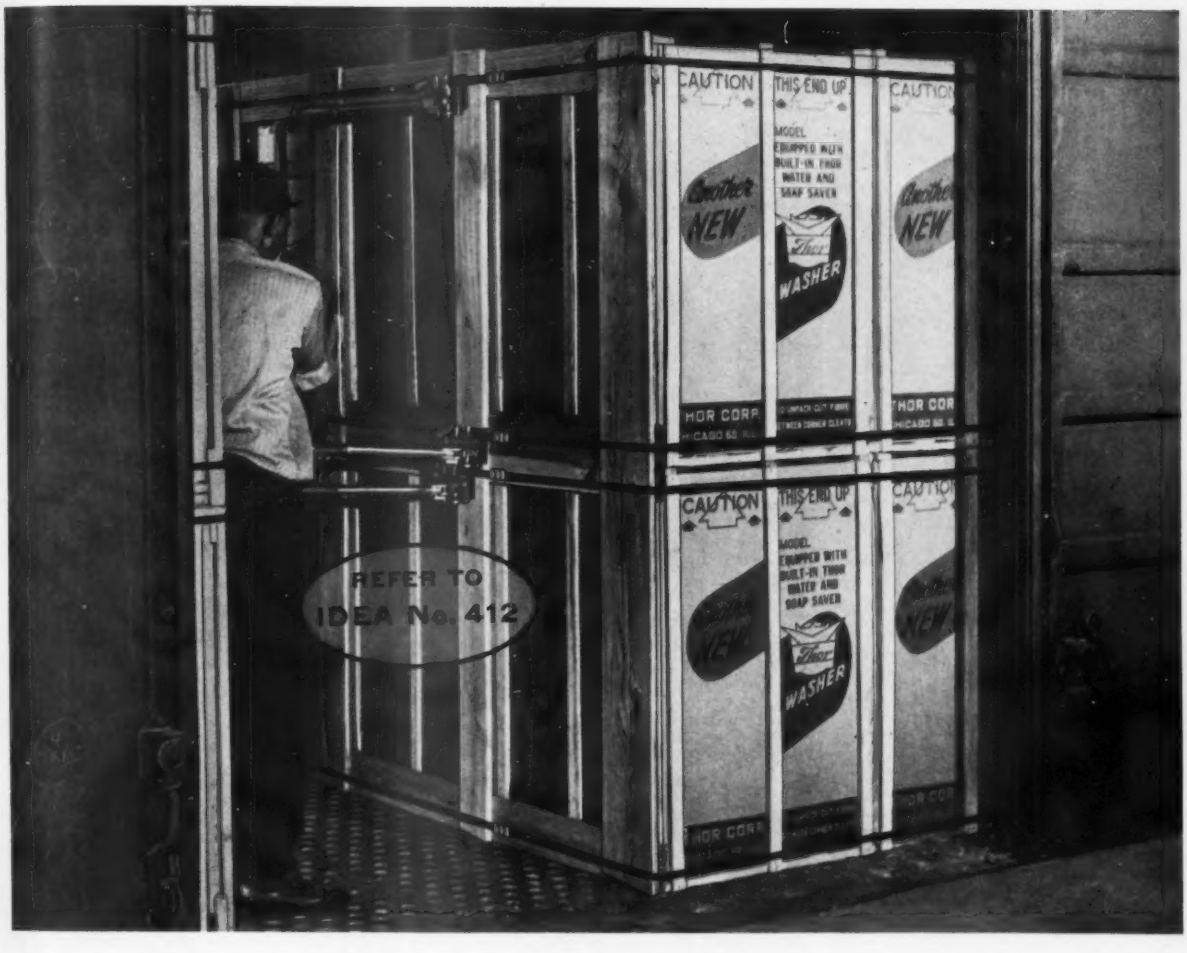
We'll test them, duplicating all conditions of actual transit. *You'll* get a full engineering report, along with the clinic's recommendation for any improvement in packaging that may be needed. And you're welcome to watch the tests.

This is a FREE service by Atlas Plywood. Without obligating you in any way it enables you to find out: (1) whether or not you can get a *safer* shipping container; (2) whether you actually *can* cut your present shipping costs, and; (3) just *how much* you can save.

Your Atlas Plywood representative (see Classified Telephone Directory) will be glad to make the arrangements. Or write to Atlas Plywood Corporation, 1432 Statler Building, Boston 16, Mass.

Atlas Plywood®
CORPORATION
FROM FOREST TO FINISHED PRODUCT

Plywood Containers • *Flush Doors* • *Hardwood Panels*



AIM* for Easier, Faster Carloading with Acme Steel Strapping Ideas

Help in solving this shipping problem came from Acme Idea Man, Art Hartley, of Chicago.

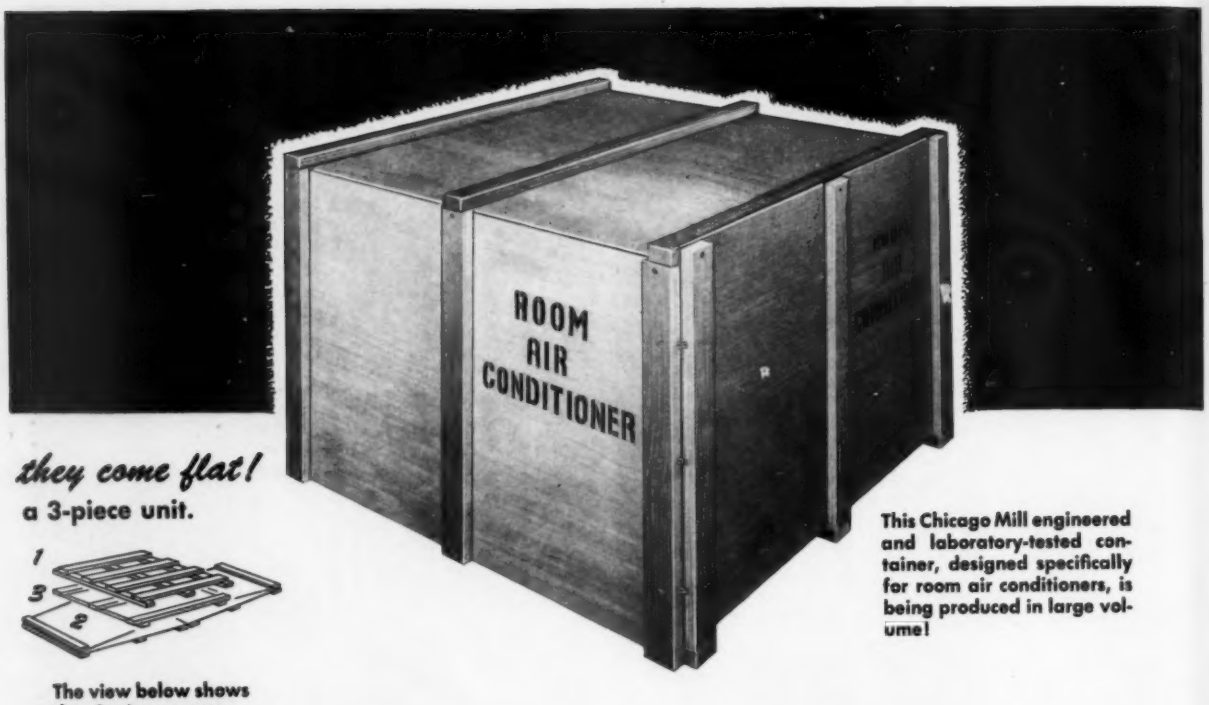
ask your *Acme Idea Man to help solve your problems

The efficiencies in modern methods of loading freight cars pay off for both the shipper and the consignee . . . in time saved and money saved. Acme Steel Strapping Idea #412 is helping prove this for Thor Corporation, Chicago. Washers, dryers and ironers are packed in cars by the "floating load" method. Because the entire load can shift on impact, up to 50% of the shock is dissipated without damaging the lading. By this Acme Steel method, loading time and dunnage costs are reduced. And since cumbersome wood bracing is no longer required, freight costs are lower. Unloading of the safely delivered appliances is underway after a simple snip of the steel strapping.

Ask your Acme Idea Man to demonstrate how you can give better protection to your shipments . . . at lower cost. Or, write Acme Steel Products Division, Dept. RS-74, Acme Steel Company, 2840 Archer Avenue, Chicago 8, Illinois.

AIM *For Safe, Lower-Cost Shipping*

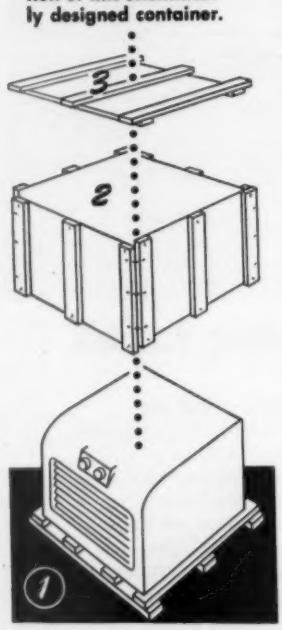
ACME STEEL



This Chicago Mill engineered and laboratory-tested container, designed specifically for room air conditioners, is being produced in large volume!

they come flat!
a 3-piece unit.

The view below shows the 3-piece construction of this scientifically designed container.



here's the *most practical* container for shipping room air conditioners!

In order to meet the requirements of the growing air conditioning industry, Chicago Mill had its engineers design the best possible container for the protection and shipment of room air conditioners. The hinged corner plywood container that was developed offers these advantages:

- Maximum protection
- Low cost
- Fast assembly
- You can stack them 20 high for compact storage with a good factor of safety

Contact your Chicago Mill representative for complete information.

A shipping container for every shipping purpose

FOR SAFER TRANSIT BY • TRUCK • BOAT • TRAIN • PLANE

CHICAGO MILL AND LUMBER COMPANY

33 South Clark Street — Chicago 3, Illinois

Plants at: Helena, Arkansas • Greenville, Mississippi • Rockmart, Georgia
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Leaving the assembly conveyor, an intermittent drive collects the packaged refrigerators into pairs and advances them to the elevator-conveyor, where the pairs are lifted overhead and transported into the storage area and lowered to ground level again — all actions are automatic. Photo shows refrigerators being collected into pairs prior to the lift on the elevator.

Westinghouse starts packaging before assembly

by J. L. McLaughlin • ASSOCIATE TECHNICAL EDITOR

REFRIGERATORS at the Westinghouse Columbus plant literally have one foot in the packaging container *before* they hit the assembly line.

The refrigerator outer cabinets are delivered by conveyor from the paint bake oven to the assembly conveyor area. During the transfer between the two areas, parts of the containers are attached to the cabinets.

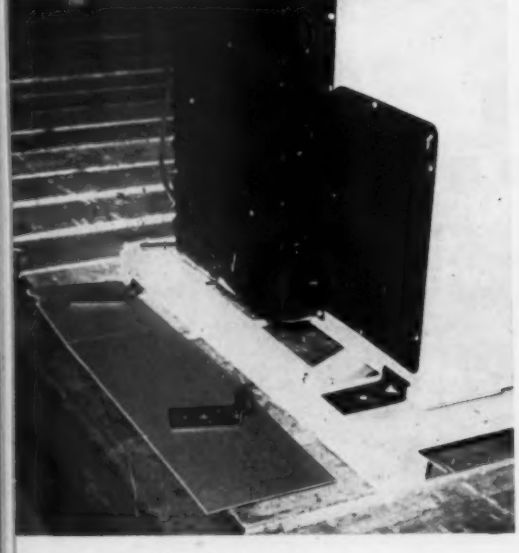
Two bolts are inserted in slots at the top back of the cabinet, impaled through cellulose crepe protected paper. An "H" shaped frame member of 2″ x 4″ stock is attached to these bolts. A wooden platform without bolt holes is placed on the assembly conveyor. The refrigerator cabinet, with "H" frame attached, is laid face

First packaging operation is placing protective wadding over bolts in shell in preparation for attaching H-shaped brace to which container cleats will be secured by nailing.

finishfotos

Refrigerator shell lying on its back on brace and pallet. Later, the inner liner will be inserted, the unit set upright and aligned on pallet, and components added or attached.

Two special brackets (see samples on board beside appliance) firmly fasten the refrigerator to pallet by hooking through two holes at the bottom rear of the shell.



up on the slat-type assembly conveyor. This shell is the nucleus to which the components are assembled.

Protecting fixtures and accessories

The unattached internal fixtures and accessories of the refrigerator are packaged in corrugated, taped boxes and wedged inside the food liner against the shelf supports. The boxes are prevented from moving by inserting a square taped tube of corrugated cardboard.

The attached internal fixtures are carefully protected during shipment by placing cellulose-faced paper between them and adjacent parts of the liner. Thus, the drip shelf, freezer door, door liner and breaker strip are separated from each other to prevent vibration and subsequent marring in transit.

A piece of this protective paper is placed over the door latch and pierced by the catch, which retains it in position as a separator between door liner and breaker strip.

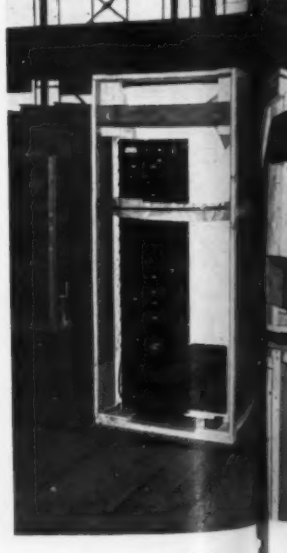
The completed refrigerator is centered on the wooden base and attached to it by two special clips at the rear of the cabinet. This method of attachment is different from the conventional way, wherein bolts pass through the base. This latter arrangement necessitates laying the appliance on its back to remove the bolts. This requires two men, and exposes the refrigerator to possible damage in handling. The Westinghouse system permits removing the retaining screws while the cabinet is upright, thus enabling one man to uncrate the unit. This is considered a boon to the small dealer.

With the base securely fixed to the refrigerator, and all the internal parts inside, the door is held securely in place by a composite sandwich of four materials, which is locked around the whole unit. The sandwich has a softened crepe cellulose facing designed to offer the best protection to the painted surface. Outside of this is the paper backing to which the crepe cellulose adheres. Beyond are several layers of corrugated board which serve as a cushion to the steel strapping which binds the whole, and at the same time provides proper spacing to bring the band in contact with the side walls of the container.

The location of this band is of utmost importance, as has been found by NST test and practice. For best results, this band must be at the same height as the wooden cleat which surrounds the shipping container. When aligned in this manner, any blow to the container transmits the

Built up pad is wrapped around the unit and secured with strapping. Pad also serves as protection for door handle. Protective paper is placed over the top, and secured with tape.

Packaged unit with th and top of container i Note corrugated pad i against a container



force through the corrugated padding to the appliance, thereby spreading the impact over a wide area, and dissipating its effect.

Further protection is afforded by a paper envelope placed over the top half of the refrigerator.

The next step in packaging is the sub-assembly of the sides, top and front of the container over an angle iron frame, used as a clamp and jig.

The four sided shape — front, left and right sides, and top — is placed over the refrigerator, nailed to the base and "H" shaped frame at the back top. This leaves open only the back side. As the conveyor advances the back panel is applied, and from a special platform the top is nailed to the front and back members of the container. This completes the packaging, the container being securely locked at the corners with a three-way overlap.

Transit twins

Coming off the packaging conveyor, every alternate refrigerator waits at the approach to a combination elevator-conveyor until the following unit catches up. Then, as twins, they are elevated to the second floor level, moved laterally along this level into the warehouse area,

to Page ST-10 →

lift truck, equipped with vertical turn- can pick up the packaged appliance, roll on its back, and place on top of load to utilize "waste" space in boxcar.

Packaged refrigerators move along trunk roller conveyor line, and are shunted into one of the storage bays on the left by operator who directs routing by pushing switch button. A single row of refrigerators in center background are coming out of storage bay and heading down trunk conveyor to boxcar loading area (see next page).

finishfotos

Along the roller conveyor spur, lift trucks stack packaged refrigerators four high, and, once again, in pairs. Warehouse has storage capacity for 100,000 appliances.

lowered to ground floor level, and ejected onto a powered roller conveyor. The roller conveyor makes a right turn and passes other elevator-conveyors similar to the one described, each having a spur feeding into this roller conveyor at switch points.

Feed-in from the elevator-conveyors is controlled by photo-electric eyes which monitor the switch. When two packages arrive at the intersection at the same time, the "eye" stops one of the conveyors long enough for the packages to clear the intersection and then starts up the other system again. In this way, flow of material is steady without manpower surveillance.

Material handling designed for maximum safety, minimum labor

The warehouse area is laid out to handle routing of composite car-loading and warehousing from manufacturing with minimum handling and labor, and with maximum safety. Facilities and equipment provide all the motive power required, and obviate the necessity for man-handling the individual packaged products.

The finished products move along a trunk conveyor and are shunted to spur conveyors by an operator who presses buttons which, in turn, throw switches and route the item to the bays where lift trucks stack them four and five high. One interesting feature of this switching system is a back-up and switch-back provision in case the switching operator makes a mistake and discovers it immediately. With this provision, he can re-route the packaged product and send it in the proper direction.

Editor's Note:

A very active participant in the nation-wide Safe Transit Program, Westinghouse has put a great deal of research into the packaging of refrigerators. As a result, damage in transit has been reduced to less than 1% on packaging, and 0.7% on the product.

The handling of packaged refrigerators, stoves and washing machines (produced at Columbus and Mansfield plants), continues to be by pairs. The lift trucks have specially designed holding arms which hold two units. Trucks lift two packages at a time off the roller conveyors and stack them. Other trucks lift them off and place them in waiting railroad box cars.

A roller conveyor system provides facilities for delivering the packaged product alongside the waiting railroad box cars. Lift trucks transfer them into the cars. An interesting development in handling is a special lift truck with a turning mechanism built into the hoist. This permits the operator to lift a refrigerator off the floor from the upright position, turn it on its back, and lay it down inside the box car on top of upright refrigerators, thereby filling the car to within inches of the top.

High activity in warehouse

The quiet and orderly movement

to Page ST-17 →

One of 8 receiving and shipping platforms in the Westinghouse Columbus plant. Here, nine freight cars can be loaded at one time. Motor-driven floor conveyor (right foreground) distributes crated appliances to the warehouse area to the right in the photo. Electric lift trucks with forks designed to carry two crated refrigerators simultaneously (center foreground) move refrigerators from warehouse area to shipping station.

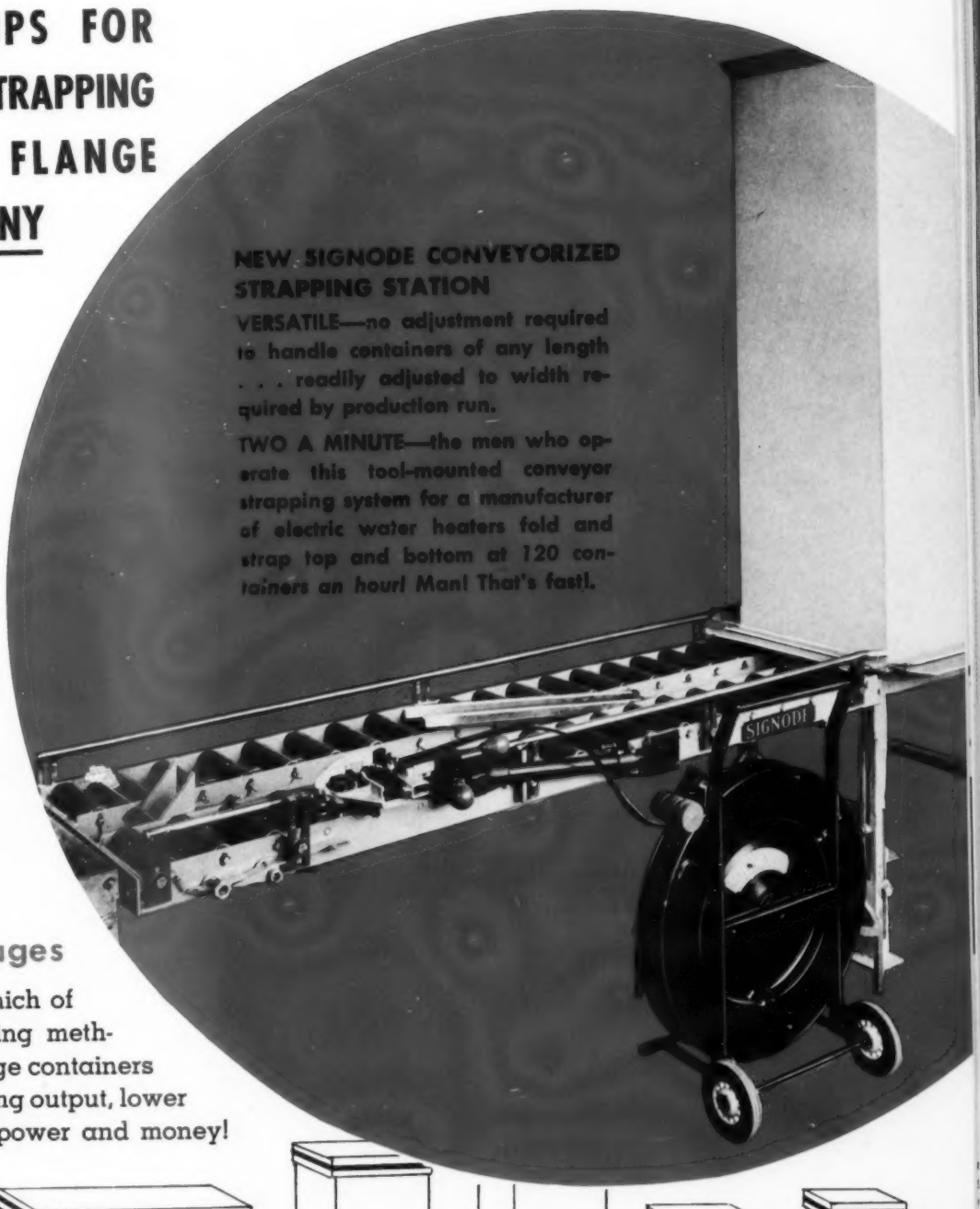
SIGNODE SETS THE STANDARDS

for the first time... COMPLETE SETUPS FOR HOLDING AND STRAPPING INTERLOCKING FLANGE CONTAINERS IN ANY VOLUME!

NEW SIGNODE CONVEYORIZED STRAPPING STATION

VERSATILE—no adjustment required to handle containers of any length . . . readily adjusted to width required by production run.

TWO A MINUTE—the men who operate this tool-mounted conveyor strapping system for a manufacturer of electric water heaters fold and strap top and bottom at 120 containers an hour! Man! That's fast!.

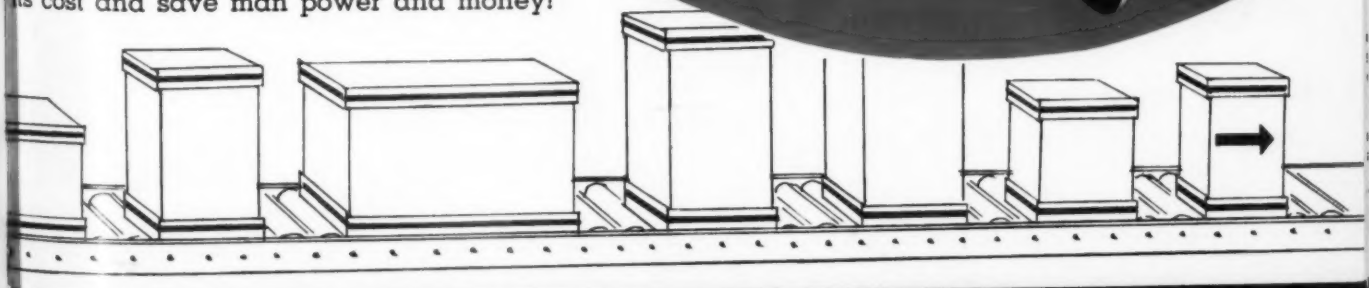


Signode offers you...

- Conveyorized strapping station
- Power strapping table
- Fast one-piece —one-hand —strapping machine
- Two-piece tool sets

Read these four fact-filled pages

Find out for yourself which of these SIGNODE strapping methods for interlocking flange containers will speed your packaging output, lower its cost and save man power and money!



SIGNODE®

SIGNODE STEEL STRAPPING COMPANY

SIGNODE SETS THE STANDARDS

SIGNODE

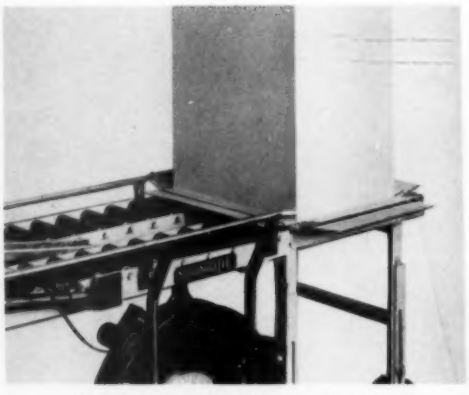
CONVEYORIZED STRAPPING STATION

PAYS FOR ITSELF QUICKLY

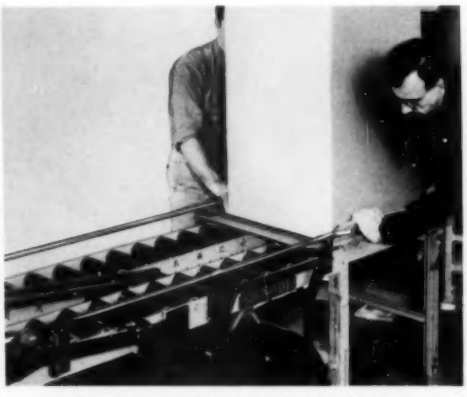
This complete strapping station makes it easy to fold, hold and strap top and bottom caps at production line speeds. It is designed and installed to meet your specific packaging needs.

The station includes mounted equipment for strapping top and bottom caps, roller conveyor section, fast strapping tools, and strapping dispenser.

Savings in strapping used, strapping time, man power, and handling time—together with the resultant faster loading in freight cars and high resistance to damage in transit—quickly pay for these conveyor installations.

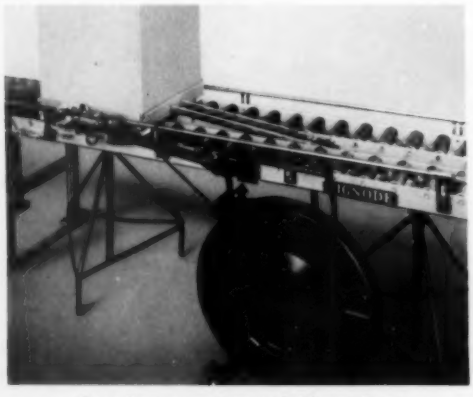


Process begins. Container is placed over unit being packaged. Bottom flanges of container line up with flanges of bottom cap that is under unit.

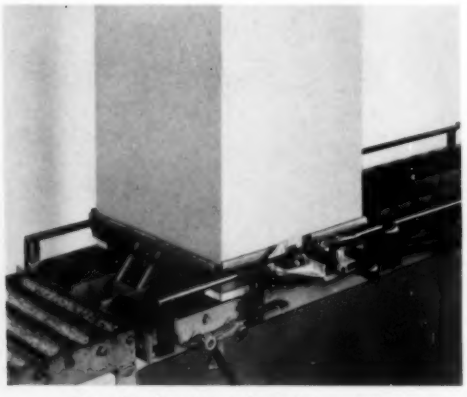


Operator and helper fold side flanges, then push the container between the flange-holding guides.

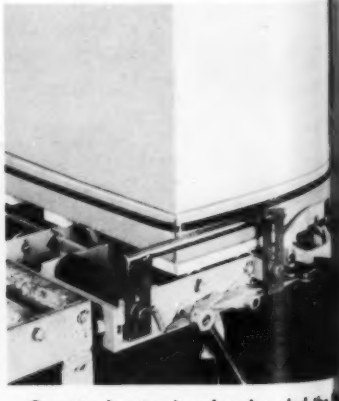
Front and rear flanges are folded [illegible] move container into position at [illegible] veyorized strapping station.



Stops have sprung up to hold rear flange in place. Multiple rear stops handle a variety of container lengths.



Strapping has been draped around bottom cap. Flange-holding guides that speed this operation hold strap at right height for tensioning.



Operator has tensioned and sealed [illegible] By depressing the spring-positioned [illegible] disengaged both the tool and the [illegible] container is now pushed to the next [illegible]

SPEED — 120 containers per hour — 2 a minute — are strapped at strapping stations like these.

SIGNODE SETS THE STANDARDS

HERE'S ALL YOU NEED

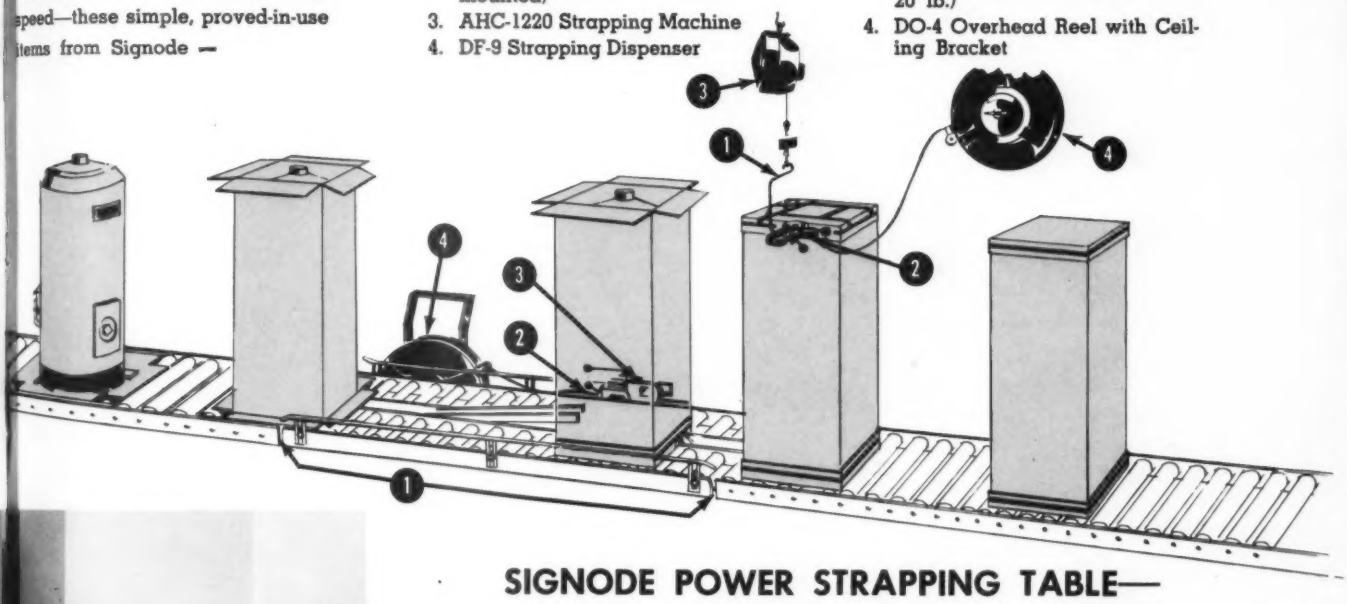
for strapping interlocking flange containers at low cost and high speed—these simple, proved-in-use items from Signode —

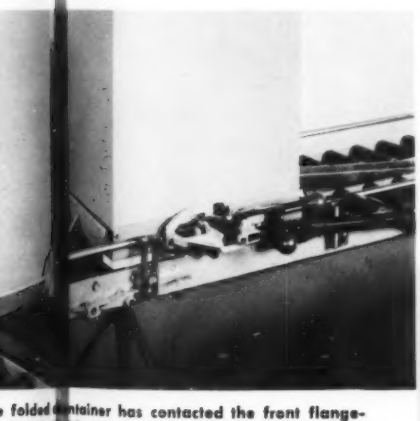
For Strapping the Bottom Cap

1. S-105 Conveyor Section—with stops
2. TM-2 Tool Mount (conveyor mounted)
3. AHC-1220 Strapping Machine
4. DF-9 Strapping Dispenser

For Strapping the Top Cap

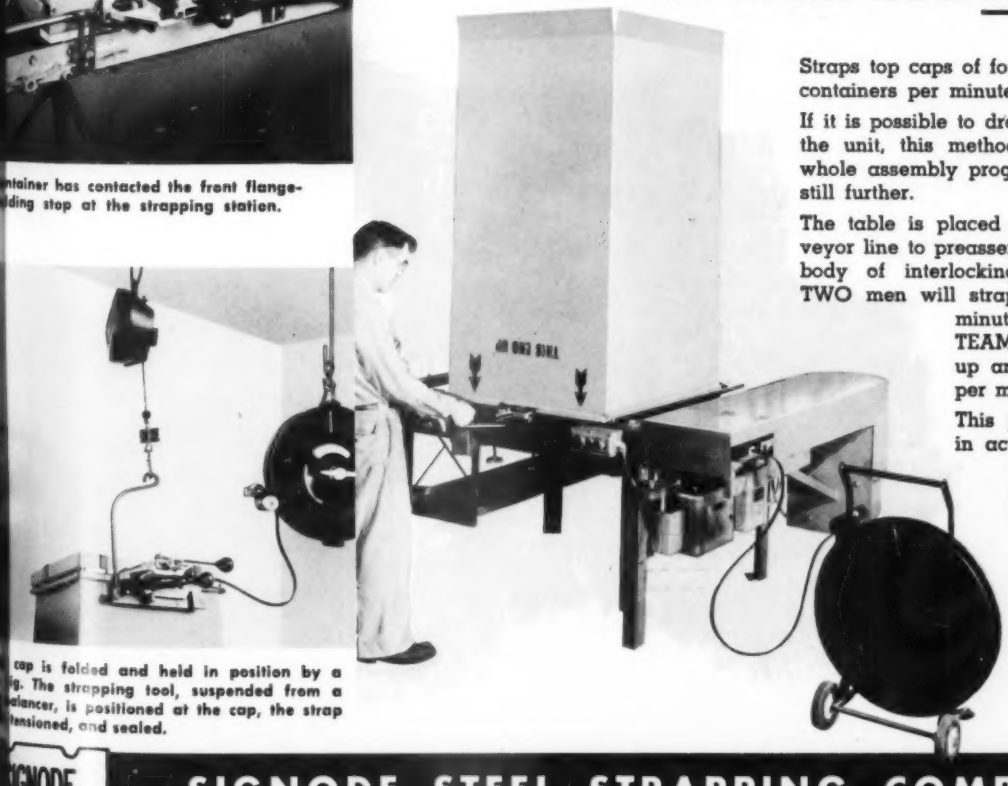
1. Suspension Hook Tool Mount
2. AHC-1220 Strapping Machine
3. Tool Balancer (capacity 10 to 20 lb.)
4. DO-4 Overhead Reel with Ceiling Bracket





folded container has contacted the front flange-ion at the guiding stop at the strapping station.

SIGNODE POWER STRAPPING TABLE—
Another SIGNODE SETUP
THAT MAKES IDEAS WORKABLE!



Straps top caps of four interlocking flange containers per minute.

If it is possible to drop the container over the unit, this method can be used. The whole assembly program can be speeded still further.

The table is placed adjacent to the conveyor line to preassemble the top cap and body of interlocking flange containers. TWO men will strap 2½ containers per minute. But a THREE-MAN TEAM will consistently set up and strap 4 containers per minute!

This proved Signode idea in action may be just the one you want to speed your packaging line at lowest cost!

cap is folded and held in position by a jig. The strapping tool, suspended from a balancer, is positioned at the cap, the strap tensioned, and sealed.

SIGNODE

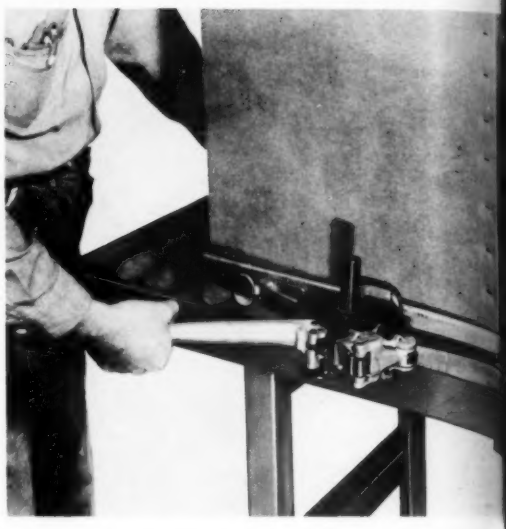
SIGNODE STEEL STRAPPING COMPANY

SIGNODE SETS THE STANDARDS

EXCLUSIVE ONE-HAND STRAPPING MACHINE . . . designed to reduce strapping costs for limited users of interlocking flange containers.

Do you ship only a part of your line of products or sub-assemblies in interlocking flange containers? Try this tool for speed and economy!

This *Signode SFC—One-Piece . . . One-Hand . . . One-Man Tool* is the only seal feed strapping tool that can be placed on the strap with one hand. This leaves the operator free to use his other hand to position strapping around containers. The tool tensions and seals in one continuous motion. As a result, it is faster than tools of other types which tension only, relying on a second tool for sealing.



TWO-PIECE TOOL SET STRAPS INTERLOCKING FLANGE CONTAINERS, TOO

These sturdy, lightweight tools are just as capable of giving the shipper tight protective closures as any of Signode's power or mounted tools. They are designed to enable smaller shipping rooms to take advantage of their economy and general usefulness. They may be used to strap any type of container, including interlocking flange containers.

WHO USES SIGNODE EQUIPMENT AND METHODS?

The use of interlocking flange containers and Signode methods and equipment is open to many industries. Today, they are used with great success in the appliance industry—washers, ranges, refrigerators, water heaters, air conditioners, etc.; by manufacturers of industrial equipment and machinery for packaging pumps, vacuum systems, subassemblies, etc.; by the chemical industry for packaging bulk products of many kinds; and to package such products as rubber hose, rugs, shoe soles, bolts of cloth, grains, seeds, feeds, and many other commodities.

CAN YOU USE THE ADVANTAGES OF INTERLOCKING FLANGE CONTAINERS AND THE SAVINGS OF SIGNODE EQUIPMENT?

Here's one good way to find out. **Fill out this coupon—and mail it to SIGNODE!**

What product do you manufacture?.....

What type of container are you now using?.....

How many shipping containers do you assemble per hour?..... **per day?**.....

Your name..... **position**.....

Firm name.....

Address.....

City..... **Zone**..... **State**.....

SIGNODE®

SIGNODE STEEL STRAPPING COMPANY

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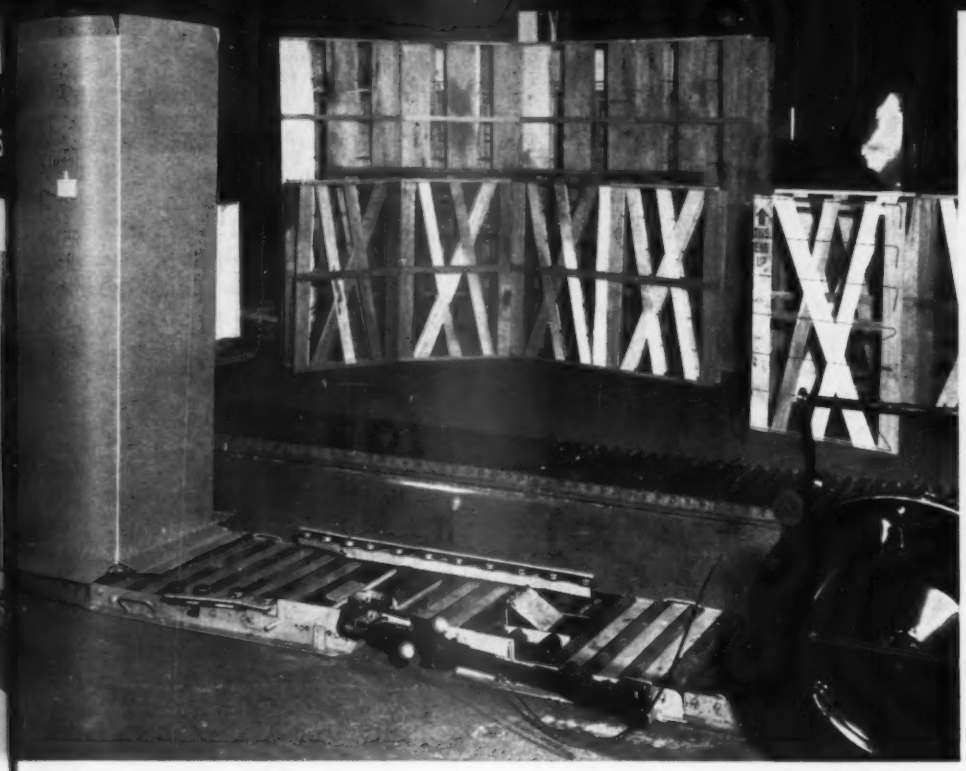


A conveyorized strapping station at Rheem's Chicago plant—showing how seal feed strapping machine is mounted on tool arm and balancer. Container flanges are folded by hand and held in place by roller guides and end stops while strapping is applied.

Rheem installs conveyorized strapping

water heaters produced at Chicago plant can be packed in interlocking flange containers at the rate of two a minute

RHEEM Manufacturing Company, one of the leading producers of water heaters, uses interlocking flange containers. Packaging speed, especially in the application of steel strapping to top and bottom caps, was their problem — a bottleneck at the end of a fast-moving production line. The reason being the relatively slow speed with which these containers could be strapped. Their own packaging engineers, the packaging experts from the container supplier, and the engineering staff of the strapping supplier, attacked the problem of increasing strapping speed from many different angles.

A little more than six months ago this cooperative venture paid off with the introduction of a brand-new idea — *the conveyorized strapping station.* The system as described is the result of several months of engineering and experimental work, and, according to Rheem engineers, will be subject to refinement based on actual use.

Bottlenecks in the old strapping operations

The first obvious bottleneck in packaging water heaters at Rheem was a wholly inadequate method used to hold and fold the container flanges. Positioning the steel strapping while holding flanges in place was slow work. Operating even a fast seal feed strapping machine under such conditions robbed it of its built-in efficiency. As a result, it was not unusual

Operator rapidly tensions, cuts and seals in one continuous operation. The stop (right), which holds the flange during strapping operation, drops down automatically as operator disengages strapping machine from container.

to see heaters backed up on the conveyors almost to the assembly lines.

Another time-wasting and expensive operation was the use of cut-to-length strapping. Each piece had to be handled individually. Each piece left protruding ends which had to be cut off and discarded. This was waste of material too.

Then there was the waste in manpower. To keep shipping production abreast of orders, more men had to be added, or men were shifted from other jobs to fill in when peak loads were reached. Under such conditions packaging costs were high and production low.

Conveyor is key to new method

The engineers who tackled the problem of strapping interlocking flange containers speedily began with a specially designed split conveyor section which fits into the plant conveyor system. Guides to hold the hand-folded side flanges in place were fastened to the sides of the conveyor section. Automatic stops were placed between the two roller sections of the conveyor to hold the end flanges firmly upright. Both guides and stops permitted the strapping to be placed at the right spot on the flanges. The over-all length of the special conveyor section varies with the length of the container to be strapped. While the width of the conveyor section can be expanded to receive containers of varying widths, it is not possible as yet to use the section in a production line which alternately feeds containers of varying sizes into the strapping station, and the cooperating engineers now have this problem under investigation.

Editor's Note:

Previous feature articles have shown methods of sealing and strapping corrugated shipping containers for appliances and other metal products. This new development, for use in connection with the interlocking flange container, should be of interest to many readers.

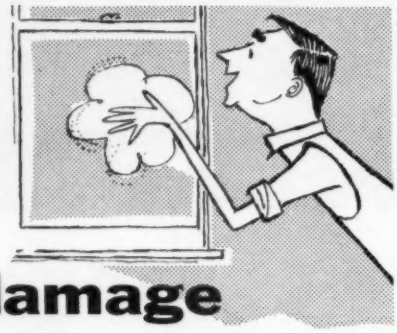
PHOTOS COURTESY SIGNODE STEEL STRAPPING CO.

Once the method of folding and holding the flanges was perfected, it remained only to attach the strapping machine in the right place for fast action. A special adaptation of a seal feed semi-automatic strapping machine is used. Special tool mounts were developed, and a spring-loaded balance arm was incorporated to hold the machine in place. Strapping is fed to the machine from a standard strapping dispenser, eliminating use of wasteful cut lengths of strapping.

With a practical answer found to the problem of holding and strapping the bottom flanges on an interlocking flange container, attention was turned to strapping the top cap in place.

First, a strap-iron jig was constructed to hold the flanges on all sides in position for strapping. A suspension hook tool mount, carrying an adaptation of a seal feed strapping machine, and a tool balancer were installed as the next strapping position. An overhead reel was mounted on a ceiling bracket to hold the strapping.

what polishing a window can teach you about

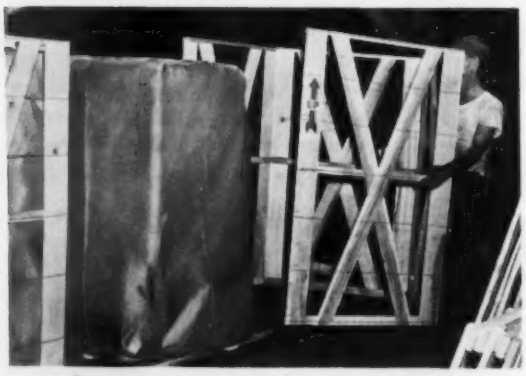


abrasion damage

Ever notice the harder you rub a window, the more dust and lint is attracted to it? Now manufacturers have found the same principle causes abrasion damage in shipping metal and enamel-finished products.

Slight friction due to car movement creates static electricity, attracting dirt, dust and soot to unprotected surfaces. These abrasive particles can ruin a fine finish. Result: lost sales, damage claims.

PREVENT ABRASION DAMAGE WITH CROMWELL *finish-protection* COVERS



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ST-16

How the strapping station operates

Each strapping station—conveyor section and suspended top cap strapping position — is operated by two men. Water heaters approach on the conveyor, already positioned on the bottom cap and riding on thin wood runners which are a part of the bottom cap assembly. The tube of the container is dropped over the heater as it approaches the conveyorized strapping station.

At this point, the two men who apply the bottom strap take over, and fold the side flanges, which are then held in position by guide rails on the conveyor. As the unit nears the strapping position, the front and rear flanges are folded and held in position for strapping by stops which operate automatically. With all flanges tightly folded and held, the strap is quickly placed around the container, tensioned, sealed, and cut off.

The strap is always at the right height, positioned by the guide rails, the stops, and by the strapping tool itself. No strapping is wasted, and the end of the coil remains in the tool, ready for the next container.

As the operator disengages the strapping machine, the forward end stop automatically drops between roller sections, and the unit is pushed to the top cap strapping position. Two men quickly put in the top frame to center the heater in the container, put on the cap, fold the flanges and position the flange-holding jig. Then the strapping tool is engaged under the flange of the container, and the strap is drawn from the overhead reel, placed around the container and tensioned, sealed and cut by the strapping machine. The completely strapped carton now is taken away by a lift truck, either on pallets or by means of specially-designed shoes which slip beneath the flanges.

SERVEL BUILDING WAREHOUSE

Plans for constructing what may be the largest warehouse building in Evansville, Ind., were announced by W. Paul Jones, president of Servel, Inc.

When completed, the new warehouse will provide 267,000 sq. ft. of floor space for the storage of finished products. It will be located on an eight-acre plot adjoining the Servel plant .

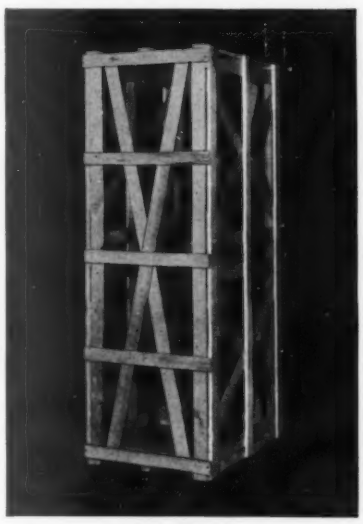
Westinghouse . . .

→ *from Page ST-10*

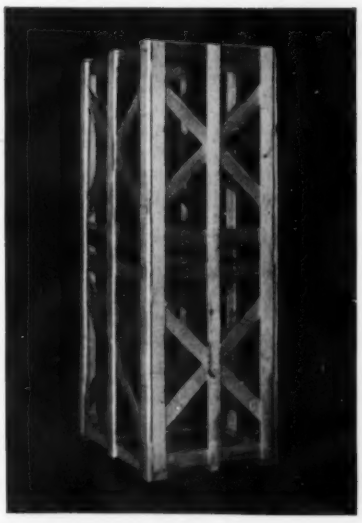
of material within the warehouse belies the true speed and volume handling being carried on. The building can house 100,000 major appliances and provide for mixed shipments, not only of models of the same item but of mixed items as well.

Although handling done here is on a grand scale, the system is geared for high speed handling within this building while still taking into consideration the small dealer who does not have the elaborate handling system at his disposal. The provision for one man uncrating and handling at the ultimate user's location might be a good example of a trend of thinking which should insure good will at the end of the distribution line.

WHICH CRATE IS BETTER?



CRATE A



CRATE B

The crate on the left is a pre-tested Weyerhaeuser crate. Though both crates will carry similar products, from the standpoint of economy, strength and durability, the Weyerhaeuser crate is a better buy. Here's why:

1. It uses 31.3% less material, weighs 16 pounds less, and costs 26% less!
2. It reduces assembly time, because the design automatically and accurately positions the various panels.
3. Its special lock-corner construction makes the Weyerhaeuser crate extra-strong and extra-rigid.

Leading manufacturers have depended for years on expertly-engineered Weyerhaeuser crates. Write for folder describing our crating service.

Weyerhaeuser Sales Company

Industrial Wood Parts Department

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CERTIFICATION FOR PORCELAIN METALS; TWO ADDITIONAL LABS.

The National Safe Transit Committee has announced the certification of Porcelain Metals Corp. of Louisville, Ky., as the 154th manufacturer participating in the National Safe Transit Program.

Two additional certified laboratories are International Paper Co., Wooster, Ohio, and The Mengel Co., Inc., corrugated box division, New Brunswick, N.J. Both International Paper and Mengel each have five laboratories now certified under the National Safe Transit Program.

CHICAGO, MILWAUKEE INDUSTRIAL PACKAGING, HANDLING MEN TOUR KIMBERLY-CLARK MILLS

In this era of comprehensive trade shows and merchandising motorcades, two chapters of the Society of Industrial Packaging and Materials Handling Engineers augmented their regular technical programs by devoting a full day (May 7) to study the industrial packaging and materials handling operations at Kimberly-Clark Corp.

Participating in the plant tour were 29 members of the Illinois Division, led by Jos. Carrigan, of Spiegel, Inc., vice president of the SIPMHE Chicago Chapter. The Wisconsin group of 22 members was headed by Gordon Kipp, of Cutler Hammer, Inc., Milwaukee Chapter president.

The Chicago and North Western Railway assigned a private car to the Society for the trip to Neenah, Wisconsin, and the Illinois contingent left Chicago late in the afternoon of May 6, stopping enroute at Milwaukee where the tour was joined by the Wisconsin delegation.

Three Kimberly-Clark staff members — E. C. Evans, R. J. Piltz and J. E. Kirk — acted as official escorts throughout the entire tour. Upon arrival at Neenah, transportation was provided to the Kimberly-Clark sales promotion center for a welcome dinner and get-acquainted hour with plant officials. Sleeping accommodations were arranged at Valley Inn.

A wealth of valuable information was crowded into a well-planned agenda for May 7, including stops at the Badger-Globe mill, Lakeview mill and the research and development center.

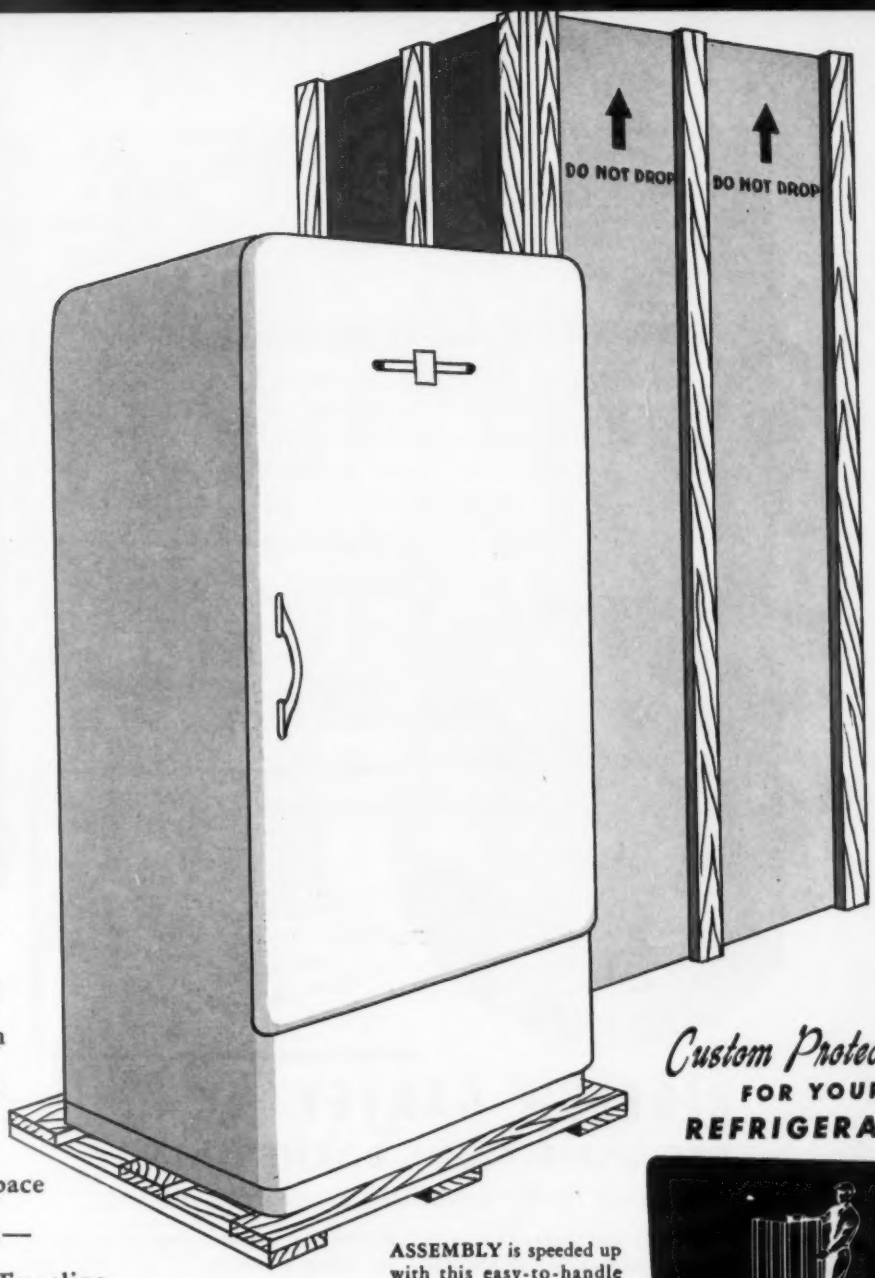
The program included functional tests on interior packaging materials, a research slide tour, and three discussions by company officials: A. Croxson, "Kimberly-Clark and the Industrial Wadding Business"; E. C. Burch, "Functions of an Interior Packaging Material"; and J. A. Hoff-

to Page ST-20 →

During tour of Kimberly-Clark mills, SIPMHE members relax to have their photo taken: Top row, left to right, Russell Ellis, Orchard Paper; William Dalton, Container Laboratories; Geo. Thompson, Empire Box; John Suchodolski, Menasha Wooden Ware; Ed McHugh, Minnesota Mining; Ray Fredrick, A. George Schulz Co.; and Eugene Weins, Jacobsen Mfg. Bottom row, left to right, Gordon Kipp, Cutler-Hammer; Ray Sell, Koehring; Jos. Carrigan, Spiegel; Edw. Cooley, Triangle Box; and J. E. Kirk, Kimberly-Clark.

Left below: Laboratory demonstration, during plant tour, covered principles of abrasion in industrial packaging. Right below: John A. Hoffman, chief of K-C industrial wadding, customer acceptance lab., uses drop test to demonstrate impact effectiveness.

WATKINS has the container for your shipping problem



ASSEMBLY is speeded up with this easy-to-handle container. The assembly crews are all for packing the Watkins Way.

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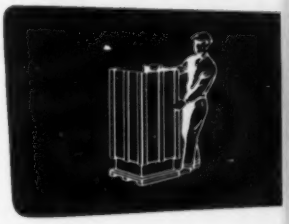


these companies build WATKINS containers

Cornell Paperboard Products Co. ..... 1514 E. Thomas Ave., Milwaukee, Wis.
Cozier Container Corp. ..... 446 East 131st Street, Cleveland, Ohio
Crate-Rite Mfg. Corp., Division of Pacific Ports Ind. Inc. ..... 10901 Russett Street, Oakland, California
Dura-Crates, Inc. ..... 940 East Michigan Street, Indianapolis, Indiana
General Box Co. ..... 1825 Miner St., Des Plaines, Illinois, and 16th and Maple Sts., Louisville, Kentucky
Houb & Martin Mfg. Co. ..... Watseka, Illinois
Illinois Box & Crate Co. ..... 811 Center Street, Plainfield, Illinois
Kieckhefer Box & Lumber Co. ..... 1715 West Canal Street, Milwauk
Lane Container Corp. ..... 10212 Denton Road, Dallas
Lewisburg Container Co. ..... 243 Singer Street, Lewisbu
Livingston Wood Manufacturing, Ltd. ..... Tillsonburg, Ontario,
Love Mfg., Inc. ..... 608 South Commerce Street, Wichita,
Pennsylvania Box & Lumber Co. ..... 2331 N. Bodine St., Philadelphia
Utility Crate Corporation ..... 1985 E. 16th Street, Los Angeles 21, C

—an inquiry to any of these companies will get prompt atte

The · WATKINS CONTAINER · Manufacture

man, "A Competitive Evaluation."

A consensus of the group, which entrained for Milwaukee and Chicago on the evening of the second day, indicated that instructive, well-organized plant studies will become increasingly helpful for those industries which recognize that progress is best achieved through unity of thought and purpose concerning common industrial goals and economies.

ARR CONDUCTS SIXTH LOADING, PACKAGING SEMINAR

Continuing into the second year, the sixth in a continuing series of seminars was conducted recently at the Container and Loading Research and Development Laboratory, of the Association of American Railroads, Chicago.

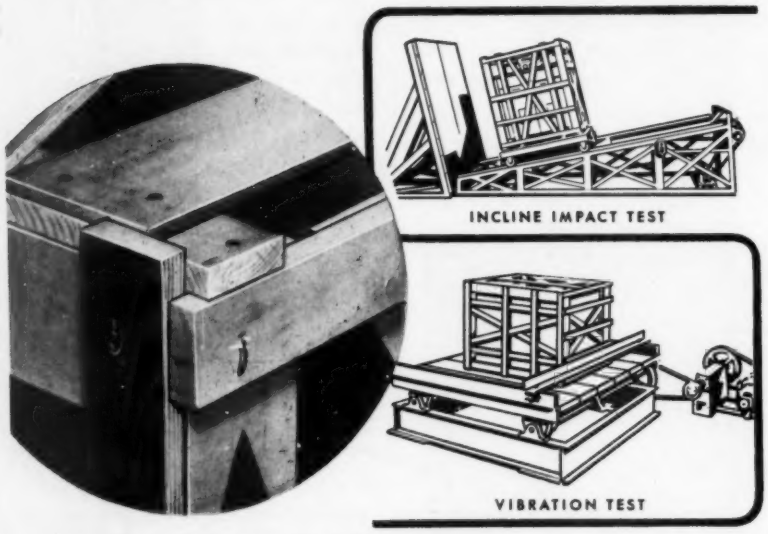
A group of railroad men, including representatives from the Canadian railways, and the U.S. Air Force attended the seminar.

The course of instruction was planned so that the railroad men in attendance, with varying degrees of experience in the field, would have some useful and constructive information which they could discuss and apply in a practical and economical way on the daily problems confronting them in their relation with shippers.

Included was information on the construction of wooden containers, and how strength can be built into a crate by rearranging structural members, and even reducing the amount of lumber used.

In similar applied approaches to interior packing, various types of containers and their proper loading were covered in detail.

In the field of blocking and bracing of heavy equipment, including machinery, an entire day was devoted to conducting impact tests and demonstrations on the test track adjacent to the AAR laboratory.



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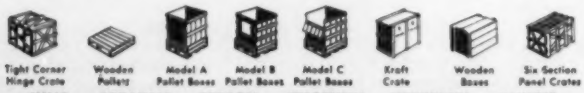

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NST APPROVAL FOR GAYNES, IMPACT-O-GRAPH EQUIPMENT

The Technical Planning Division of the National Safe Transit Committee has approved an impact recorder (for use with Conbur incline impact test) made by Impact-O-Graph Corp., Cleveland, and the vibration, incline impact (Conbur), and drop test equipment made by Gaynes Engineering Co., Chicago.

ANNOUNCE MATERIAL HANDLING SHOW FOR 1956 IN CLEVELAND

The board of directors of The Material Handling Institute has announced that MHI will organize and sponsor a Material Handling Show to be held in Cleveland at the Public Auditorium in 1956 on June 4, 5, 6 and 7.

Admission of spectators to the Show will be restricted to properly qualified representatives of all branches of industry and will not be open to the general public. Cost of space to exhibitors is planned to be 50% less than space purchased by exhibitors at the Philadelphia Show in 1953.

NEW HEMB & MARTIN PLANT

Hemb & Martin Mfg. Co., Watseka, Ill., producers of wood cleated corrugated containers, boxes and crates, has announced the opening of a new plant and office in Murfreesboro, Tenn., with D. J. Ruth in charge.

SIPMHE CONCENTRATES ON EDUCATIONAL EXPANSION

As management becomes increasingly aware of the operational savings achieved through elimination of shipping losses and conservation of time, space and manpower, the Society of Industrial Packaging and Materials Handling Engineers continues to broaden the educational scope of its technical program.

Walter J. Byrd, Standard Brands, Inc., chairman of the 1954 Annual Educational Short Course, to be featured in Chicago — September 27-30 — in conjunction with the 9th SIPMHE Exposition and the National Packaging and Materials Handling Competition, announces that as a result of a survey to the national membership and to those who attended previous Short Courses the program will be expanded to a total of at least 18 technical sessions.

Co-sponsored by the University of Illinois, the Course will again feature a "Fundamentals of Packaging" series, with an additional series on the "Fundamentals of Materials Handling," and an Advanced Section, having special emphasis on "Materials Handling Costs," "Packaging Machinery," "Consumer Packaging," and "Work Simplification," to name a few of the many topics.

In addition to this national effort, SIPMHE chapter work also shows concentration on educational development. The Missouri-Kansas Division, at Kansas City, together with a local chapter of the Society for the Advancement of Management, are working with the Extension Division of the University of Kansas, in the development of a "Conveyor Conference" tentatively scheduled for the fall of 1954. A steering committee for the project is headed by O. M. Coffman, of Owens-Corning Fiberglas Corp.

PALLETAINER'S exclusive locking devices hold sides securely regardless of load. Cannot be accidentally released, cannot be lost. Conveniently located for fast, safe, simple release.

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HI-LODE PALLETAINERS are available in a broad range of sizes, types and capacities to meet every conceivable handling requirement. Get the facts from your nearest USP PALLETAINER representative today. He will be glad to help you solve your handling problems and save your handling dollars.

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CARRIER PLANNING FOR 75% INCREASE IN PRODUCTION

Carrier Corp., Syracuse, N.Y., is planning to rearrange and improve its facilities to make possible a 75% increase in production of room air conditioners this year.

MORAN HEADS SALES FOR CONLON-MOORE DIVISION

Bernard J. Hank, president of Conlon-Moore Corp., Chicago, has

confirmed the appointment of W. T. Moran as general sales manager for the Moore Division, Joliet, Ill. Moran has been associated with the division's sales department for the past eight years.

CLASSIFIED ADVERTISING

POSITION WANTED

CERAMIC ENGINEER — with 5 years experience in supervision and process control of porcelain enamels — desires to relocate in midwest. Complete resume of business and personal background will be submitted upon request.

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This is one of the big advantages of Porcelain Enamel on Armco Enameling Iron:

You can adapt this modern finish to practically any design for the products you make. It may not even be necessary to change your present designs to assure uniformly good results—in your shop as well as when your products are in service.

Four important factors should be kept in mind when designing parts or products for porcelain enameling: (1) correct radii of curvature on all parts; (2) sufficient internal support at all points; (3) metal of sufficient thickness to resist warping or twisting during firing; and (4) the metal should be made specifically for porcelain enameling.

OFFERS SALES AIDS

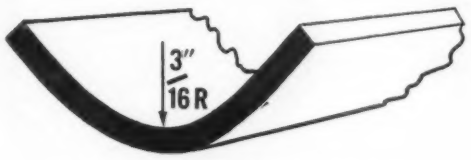
Besides its adaptability to modern design, Porcelain Enamel stands out as a sales-aid in comparison with other finishes.

It is a "*lifetime finish*" that is not affected by time or corrosion. It resists acids, and is not harmed by hot skillets, forgotten cigarettes, or even hot electric irons. What's more, stains and dirt come off easily when the surface is washed with soap and water.

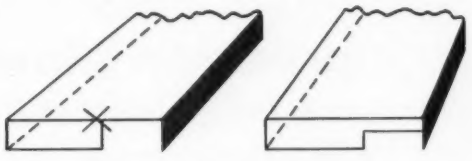
Porcelain Enameled products can be supplied in any color and in any variation of shades. Colors never "fade out" or lose their original luster.

UNIFORM QUALITIES

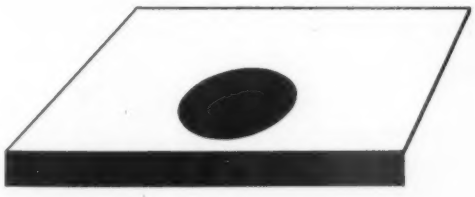
Of course, the metal beneath the Porcelain Enameled surface must have excellent bonding qualities, flatness, and uniform fabricating characteristics. That is why more manufacturers have used more Armco Enameling Iron over a longer period than any other enameling base. That is why too it has become known as the "World's Standard Enameling Iron."



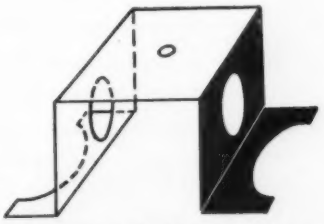
The radii of curvature of metal parts to be porcelain enameled should always exceed 3/16".



Lack of support at Point X could result in flexing and chipping. Maintaining part of flange (sketch at right) corrects this.



Flanging of edges near large holes gives needed support, which prevents deforming of metal during firing.



Support lugs or clips should be of lighter gage and cut away at junction points, to reduce area of double-thick metal to be heated when coatings are fired.

ARMCO STEEL CORPORATION

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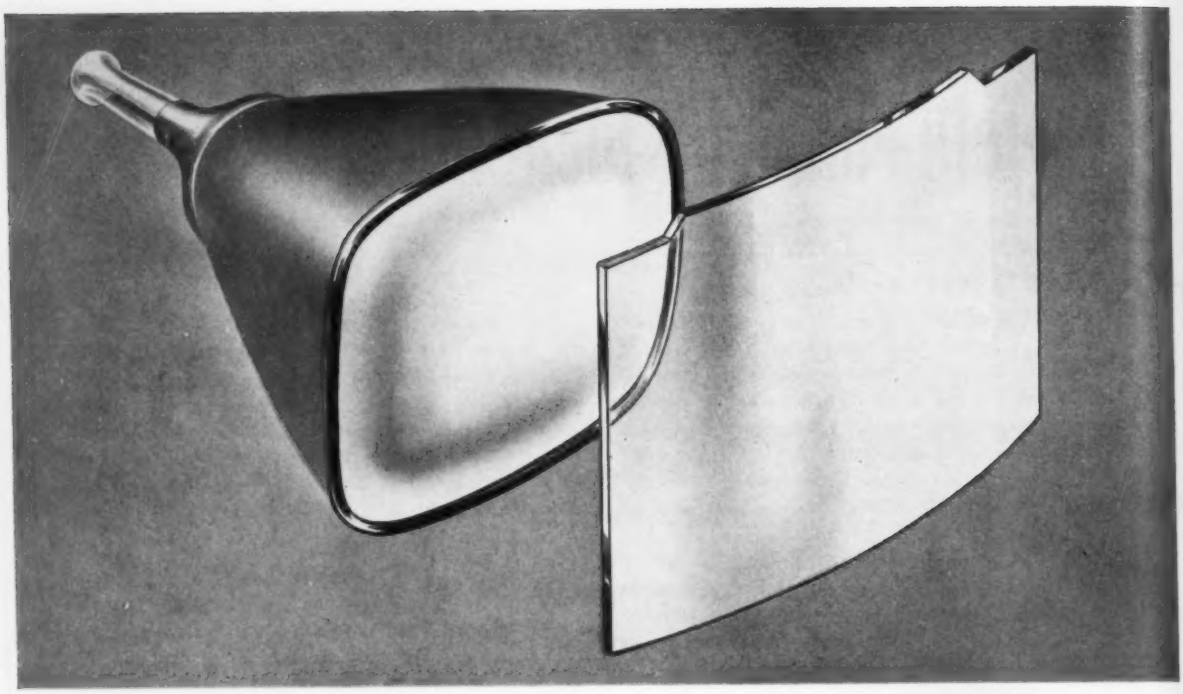

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August • 1954

VOL. 11 • NO. 8

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Elmhurst, Illinois
Telephone Elmhurst 9706

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A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. Includes technical and practical information on plant facilities and manufacturing problems from raw metal to safe delivery of the finished product, with special emphasis on fabrication, metal preparation, metal finishing, assembly, and packaging and shipping.

Free controlled circulation to management, purchasing, engineering and key plant personnel in metal product manufacturing plants. To others, subscription price is $5.00 per year, domestic. To all other countries $8.00 per year (U.S. funds).

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FROM RAW METAL TO FINISHED PRODUCT

D-Enameling*
IS NOW A PERMANENT PART OF THE APPLIANCE MANUFACTURING PICTURE
Once D-Enameling was a temporary expedient which appliance manufacturers used to stretch critical steel supplies, but that day is gone! Now, America's leading appliance manufacturers consider D-Enameling a permanent part of their manufacturing picture. D-Enameling has come of age ... has assumed its role as a routine step in appliance manufacturing. The reason is simple, D-Enameling transforms scrap loss into profit dollars.
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The strong steel encased, double pane PERMA-VIEW window incorporates the finest quality heat resisting glass. It is mechanically sealed to prevent infiltration of vapors and to eliminate "fogging." This "non-fog" window meets the constantly growing demand for "visible baking."

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FOR EXTRA PROTECTION

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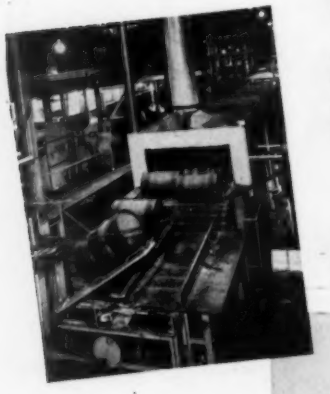

1. **ALKALI CLEANING** removes oil, grease, fingerprints, hand-marks, other surface soil;
2. **SULFURIC ACID PICKLING** then removes mill scale;
3. **GRANODIZING** converts the chemically cleaned steel surface to a uniform phosphate coating. The "Granodine" coating being non-metallic is an ideal bond into which the paint finish is "keyed" or anchored;
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- **EXTRA PROTECTION** for the steel container—an inert barrier against rust creepage.
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MEETINGS

EASTERN ENAMELERS OUTING

Eastern Enamelers Club, annual outing, Yardley, Pa., August 28.

KITCHEN CABINET MEETING

Steel Kitchen Cabinet Manufacturers Association, quarterly meeting, Hotel Cleveland, Cleveland, Ohio, September 15.

ENAMELERS FORUM, MEETING

Porcelain Enamel Institute, annual Shop Practice Forum, University of Illinois, Urbana, September 8-10.

Porcelain Enamel Institute, annual meeting, The Greenbrier, White Sulphur Springs, W.Va., Sept. 29-Oct. 1.

PACKAGING, HANDLING SHOW

Society of Industrial Packaging and Materials Handling Engineers, annual National Industrial Packaging and Materials Handling Exposition, Short Course, and Packaging Competition, the Coliseum, Chicago, September 28-30.

GAS ASSOCIATION CONVENTION

American Gas Association, annual convention, Atlantic City, October 11-14.

NATIONAL METAL SHOW

National Metal Exposition and Congress, International Amphitheatre, Chicago, November 1-5.

HOME LAUNDRY CONFERENCE

American Home Laundry Manufacturers Association, annual Home Laundry Conference, Hotel Commodore, New York City, November 4-5.

ELECTRICAL MFRS. MEETING

National Electrical Manufacturers Association, annual meeting, Haddon-Hall Hotel, Atlantic City, November 8-11.

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First, Glidden can supply you with the ideal finish for unit interiors—moisture resistant, corrosion resistant NU-PON Primer. This new coating is ideally suited for application by flow-coating or dipping. Result: maximum protective coverage and economy.

Second, The Glidden Color Studios offer you custom color styling that adapts your unit to today's decorating trends and enhances product design. These specialists, who developed the famous SPRED SATIN Dramatone color system for home decorating, have color styled a wide variety of products for leading manufacturers.

Write today for your copy of the informative booklet on Glidden NU-PON finishes.

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FOR A FAST-ACTING MUFFLE

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When speed means money, and you're tied down by a slow-acting furnace — remember this: In a given time, you can pump *four and one-half times more heat* through a muffle of CARBORUNDUM's silicon carbide than through an aluminum oxide muffle. Think what this means in terms of production! Switchovers can be almost instantaneous.

Point two: Since it's far easier to transmit heat through our silicon carbide tile, it takes less heat to do so. Operating temperatures are reached with considerably less fuel input.

Point three: Rapid heat conductivity also means completely uniform heat distribution. You'll never see any dark areas on a silicon carbide muffle. Just a bright, uniform glow. Even during a switchover there are no signs of mottling. This, of course, means closer heat control, and top quality enameling.

Have you ever thought of changing to a fast-acting furnace? A modern, silicon carbide muffle gives the advantages of speed . . . fuel economy . . . and quality control — plus good life (see photo caption). Ask us for recommendations. It makes sense to enlist the experience of the world's largest maker of super refractories. We invite your inquiries.

CARBORUNDUM
Registered Trade Mark

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PRODUCTION PROBLEM?

if you use flat-rolled steel talk to a specialist

PROBLEM With present designs and manufacturing facilities, the auto industry needs wide coils of sheet steel with a minimum number of welds. These welds must be cut out before steel goes into the big presses—a costly, time-consuming process.

SOLUTION As a prime supplier to the automotive and other industries, Great Lakes Steel has developed facilities which now produce wide coils of steel in greater lengths . . . drastically reducing the number of expensive welds in each coil. Result: important fabrication savings for our customers.

MORAL Whether you make autos, appliances, or farm machinery . . . if it's flat-rolled steel, you can't lose by talking to Great Lakes Steel—specialists in flat-rolled production and application for 25 years.

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Detroit 29, Michigan

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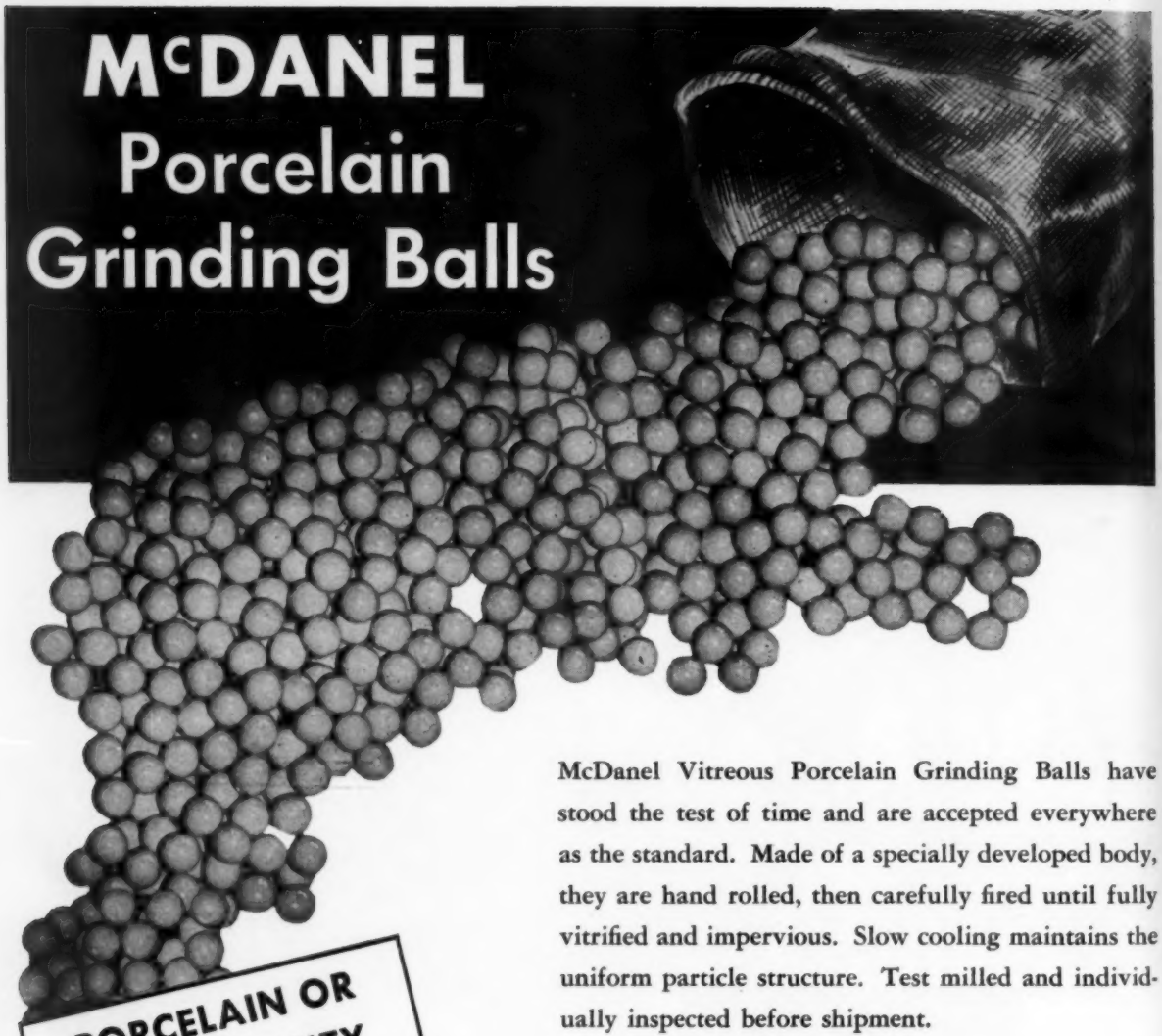
McDANEL Porcelain Grinding Balls



McDanel Vitreous Porcelain Grinding Balls have stood the test of time and are accepted everywhere as the standard. Made of a specially developed body, they are hand rolled, then carefully fired until fully vitrified and impervious. Slow cooling maintains the uniform particle structure. Test milled and individually inspected before shipment.

The McDanel Vitreous Porcelain Ball provides fast, clean grinding at low cost. Trouble free at all times. Any pick up due to wear from these balls is compatible in the batch and fires at normal temperatures for enamels and glazes. Uniform wear, no chipping or spalling.

Write for McDanel Catalog and price list.

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WASHERS | DRYERS

Lifetime beauty can be a real selling feature . . . especially in a competitive market and with such appliances as laundry equipment.

And it costs but little more to put it into your products, to give users *all* the advantages of ageless *Porcelain enamel.* Not only is Porcelain enamel immune to wear, stains and scratches, but it offers the ultimate in ease of cleaning—all strong selling points with the women who buy this equipment.

If you haven't already gone to Porcelain for the vital "insides" of your products, we would recommend you look into this, also. Again, relative costs may surprise you . . . and here, too, Porcelain enamel can help you build extra sales.

Designers will do well to consider Porcelain enamel in their plans for "best sellers". While there is nothing difficult about it, you do have to *plan* for Porcelain enamel. Can we help you with these plans?

PORCELAIN ENAMEL belongs in your PRODUCT-PLANNING

Only Porcelain enamel, the *fused-in* finish, gives you all these advantages:

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7. Wide consumer acceptance

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CLEANING UNIT

ENTRANCE & EXIT TO UPPER
DECK PRIME OVEN ON ROOF
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Typical of Peters-Dalton planned engineering are the photographs shown here. They present some of the P-D installations in a multi-storied eastern manufacturing plant. Here, versatility was required—versatility such as P-D know-how and ability to install for proper functioning such varied components as: dehydration ovens, leak test tanks, power spray washers and baking ovens. Efficient and time-saving, these P-D units are in operation on various floors of this plant, to and including a space conserving roof top installation.

Versatility such as this demonstrates P-D ability to take over your plant-wide problems . . . accept the responsibility until *production-ready*—to engineer the layouts, designs and installations up to complete Finishing Systems. Call with confidence upon P-D to solve your problems . . . meet your needs. Just write, wire or phone.

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Drying and Baking Ovens *Hydro-Whirl Dust Collecting Systems*

Peters-Dalton INC.
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THE finish spotlight

This new automatic water softener, introduced by Culligan, is styled to match kitchen and laundry appliances. All controls are concealed under the top panel which provides a table-top working surface, and makes the unit a handsome accessory to the kitchen or laundry room. The softener is fully insulated, and is finished in porcelain enamel. It will soften 12,000 gallons of hard water before regeneration is necessary.

Announcing

a new metal washing principle

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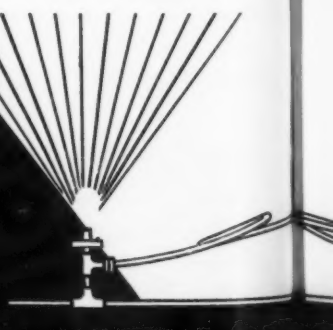
● The new Spra-Con Rotary Arm Wash[er] has been proved to be the most [ef]fective and economical method [for] the continuous cleaning of [m]ediu[m] diversified metal parts in [lar]ge volume production.



Let a Spra-Con engineer show you other savings and advantages of the Spra-Con Rotary Arm Washer

phone or write **The SPRA-CON COMPANY**

ENGINEERS AND MANUFACTURERS OF WASHERS, OVENS, AUTOMATIC PAINTING

Below: A four stage double wide Rotary Arm Washer in one of the world's largest fluorescent lighting fixture manufacturing plants.

us show you how this equipment
pay for itself in 12 months while
the same time producing the
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Case history from a production installation—

Heat requirements cut from

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to

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10,108,000 BTU per hour SAVING

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No one connected with the design or manufacture of any appliance should be without a copy of this book containing hundreds of standard and special mouldings. Send for your free copy today.

Without obligation, please send copy of "Plan Book of Metal Mouldings." F-8

Name_____ Title_____

Firm_____

Address_____

tool engineers exposition

Gentlemen:

It was most thoughtful of you to send us the June issue of *finish*, and we have reviewed all of the articles with a great deal of pleasure and interest. We are particularly grateful to you for the publicity which you have given our Society in relation to its recent 1954 industrial exposition.

It goes without saying, of course, that we hold your own organization in the very highest esteem, and only hope that you and your associates, reciprocally, will not hesitate for a moment to call upon us whenever we can be of any help to you.

Harry E. Conrad
Executive Secretary
American Society of Tool Engineers
Detroit, Michigan

---

a bible throughout industry

Gentlemen:

By this time you should be well settled in your new home in Elmhurst. I have just been thinking about the steady rise over the past years of the importance of your publications, and I feel that much of this success is due to your untiring efforts and splendid vision of what is needed in industry in regards to publications.

Your magazine *finish* has fast become almost a bible throughout industry, and its recent expansion will make it almost as widely read as "Dennis the Menace" . . .

W. D. Wilkinson
Monarch Aluminum Mfg. Co.
Chicago, Illinois

---

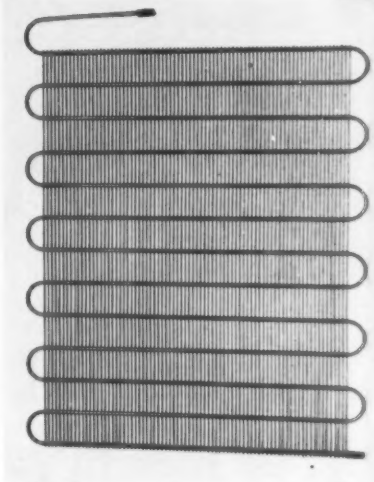
misquote indicated

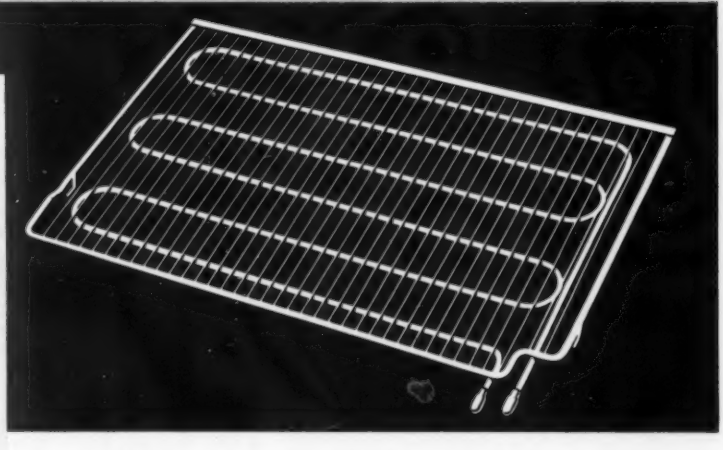
Gentlemen:

I found the July issue of *finish* on my desk upon my return from my vacation. I thought I should call to your attention an instance on page 58 in which I am misquoted as having stated at the recent ICHAM meeting, "The board of trustees stands ready to recommend expansion to include the manufacturers of washers, ironers, dryers, etc." What actually was said in my short talk on Tuesday

to Page 20 →

MORE EFFICIENCY ECONOMY EYE APPEAL with USP

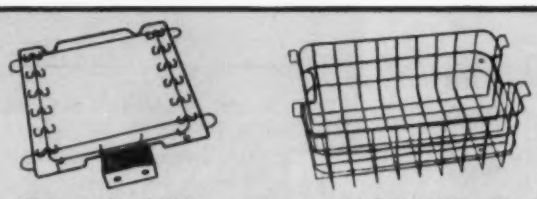




USP Condensers—also of the resistance welded, wire and tube type are providing refrigerator and freezer manufacturers with new application versatilities. Like Unifreeze shelves, USP Condensers are available to match your own equipment requirements.

Modern, Distinctive Unifreeze Shelves . . .

Another USP first! . . . Designed to surpass the exacting competitive standards of the day, Union Steel's Unifreeze evaporator shelves offer more efficiency, economy and eye appeal. They provide the permanent beauty, simplicity of installation and peak performance efficiencies. Their unique wire and tube type design permits the *maximum* conduction and convection of heat as well as a faster "pull down" factor than ordinary evaporator type shelving. Then too, Unifreeze shelves are rugged and rigid. Their sparkling clean, attractive wire and tube construction is in complete harmony with modern freezer design. Unifreeze shelves are easier to clean or defrost and they're engineered and manufactured in any practical size, shape or capacity and finish to suit your needs.



If it's made of Wire . . . you can get it from Union Steel

Whatever your wire parts problem, you'll get real help from Union Steel. You'll get the benefit of more than fifty years of experience and leadership in the design and fabrication of better, more dependable wire products. You'll also get the cooperation of USP's design engineers, plus the assurance of quality materials in the hands of skilled craftsmen. This, plus the protection of USP quality control with 100% inspection.

Why not let USP assist you in planning and producing a wire part or product that will make *your product* more efficient.

UNION STEEL PRODUCTS CO.
ALBION, MICHIGAN

Gentlemen:—Please have your representative contact us at once.

Name _____

Company _____

Address _____

City _____ **Zone** _____ **State** _____

Panels and roof for this Nabisco truck body were fabricated from Electro Paintlok by McCabe-Powers Auto Body Co., St. Louis, Mo.

IF YOU PAINT ON STEEL

this may deliver an idea to you

For National Biscuit Company, customer attraction starts on the street. Therefore, lasting paint adherence, long service life and attractive appearance are extremely important on Nabisco delivery trucks.

To obtain these results, even under extreme weather conditions and hard service, Electro Paintlok is used for Nabisco truck bodies.

Electro Paintlok is the zinc plated steel sheet that is chemically treated to take paints, lacquers, synthetic enamels – and hold them for years.

And, even though the painted surface should become scratched, the tight zinc coating guards against underfilm corrosion and creeping rust.

Republic Electro Paintlok is easy to fabricate, too. The tight zinc coating will not crack, peel or flake during normal fabricating operations. Surfaces require no pre-etching. They are preconditioned for painting.

Get the full story on Republic Electro Paintlok for your fabricated steel products that need to look better longer. Write:

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
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Other Republic Products include Carbon, Alloy and Stainless Steels — Sheets, Strip, Bars, Pipe, Tubing, Bolts and Nuts, Wire, Pig Iron

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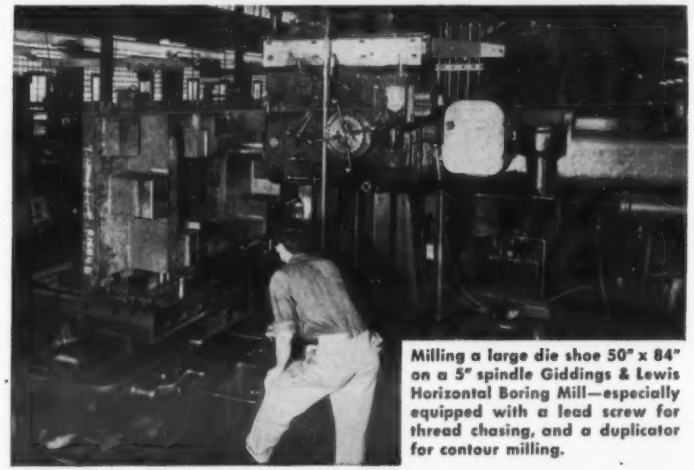
YOUR KEY TO

- simplified manufacturing operations
- increased stamping production
- lower costs—higher quality



Milling a large die shoe 50" x 84" on a 5" spindle Giddings & Lewis Horizontal Boring Mill—especially equipped with a lead screw for thread chasing, and a duplicator for contour milling.

Shown above—the assembly of various tools for the production of refrigerator and other parts.

EFFICIENT designs and builds
Dies, Tools, Jigs, Fixtures, Special Machines

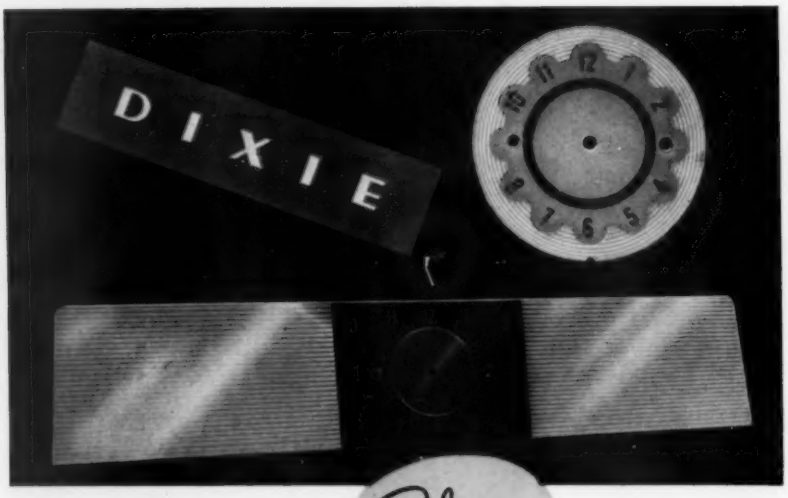
Here's experience, skill and tooling know-how you can depend on. If you have "tough" stamping problems let us suggest an ingenious solution. Whether your tooling requirements are large, small, simple or complex, we can build dies that will save you time, trouble and expense in your production.

The EFFICIENT organization has the men, machines and large modern plant to serve you well. Our complete equipment includes tryout presses up to 300 tons capacity. Sample parts are delivered for your approval before dies are shipped.

EFFICIENT engineers will be glad to consult with you, work with you, or furnish quotations. Write or phone for complete information.

THE EFFICIENT TOOL & DIE COMPANY

9314 ELIZABETH AVENUE · CLEVELAND 5, OHIO · PHONE Diamond 1-5150



Lancaster Glass Panels

DESIGNERS PREFER THEM for their versatility. Lancaster creates in glass the effects which give real life to the finest designs. Transparent, translucent or opaque areas — or a combination of all three in one panel. A choice of 943 colors for decorating with fired-in ceramics, baked-on bronzes and organic colors. Nameplates, clock faces, control panels . . . there are unlimited opportunities for the use of decorated glass to add both utility and eye appeal. And costs are low — even when several colors, or several decorating techniques, are used on a single piece.

PRODUCTION MEN WELCOME THEM because Lancaster deliveries keep production lines rolling smoothly. Lancaster precision-made parts simplify assembly problems, too.

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If you're concerned with any phase of appliance design, production or sales, Lancaster glass can make your job easier. Write or call today for more details.

LANCASTER GLASS

THE Lancaster Lens co.
Lancaster, Ohio

☐ Our specifications are attached. Please give us an estimate of costs on the following quantities:_____

☐ Please send me literature covering Lancaster service to the appliance industry.

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____

see our catalog in S PRODUCT DESIGN FILE or write for copy

From the Editor's mail

→ *from Page 16*

morning was "The Institute Trustees are currently considering a change in the association's By-Laws which would permit an even broader expansion of the Institute activities in the appliance field. In that connection we would welcome the comments and suggestions of member companies."

I think it is important that the impression should not be conveyed to other trade associations and particularly to the American Home Laundry Manufacturers Association, of which Temco is a member, that the Institute is about to embark on any type of membership raiding activity from the other associations. The Institute is very proud of its Washington service, and justly so, and it was the unanimous feeling of the Trustees that it is very possible this service can be made available to other appliance manufacturers who currently do not have a source for this type of service.

Your magazine certainly continues to grow. You are to be congratulated on the excellent job you have done.

F. Donald Hart
Executive Vice President
Temco, Inc.
Nashville, Tennessee

Mr. Hart is president of the Institute of Appliance Manufacturers, formerly known as the Institute of Cooking and Heating Appliance Manufacturers — Eds.

excise tax reduction

Gentlemen:

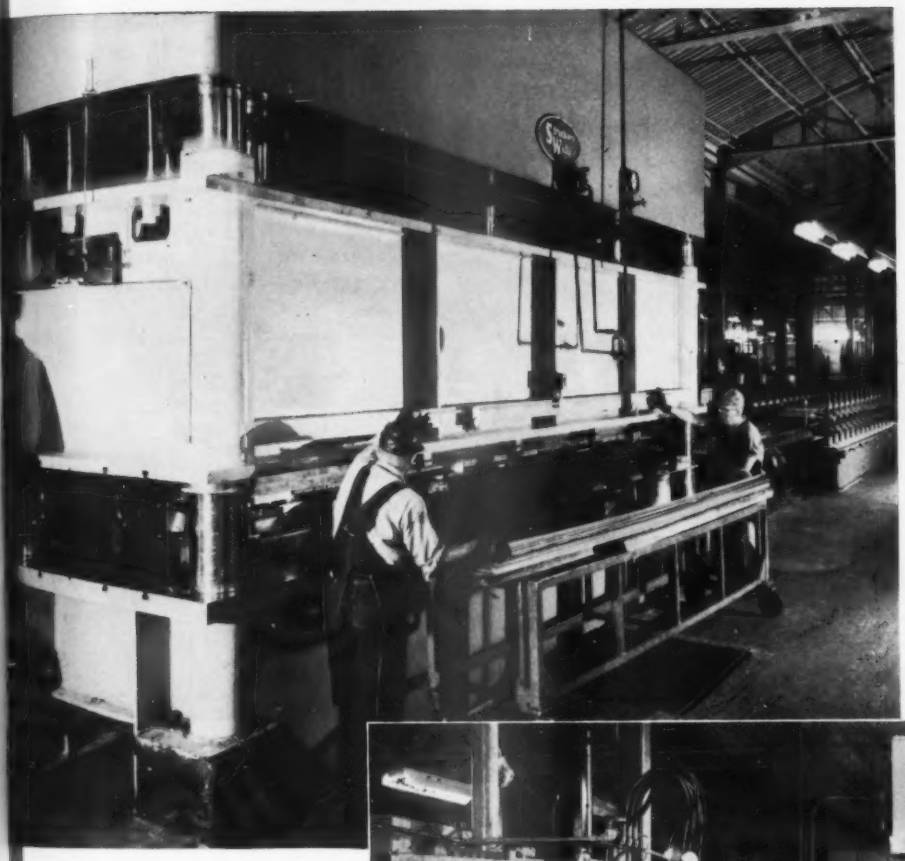
Your publication contributed substantially to the achievement of the reduction in the Federal manufacturers' excise taxes on appliances from 10% to 5%.

You kept your readers informed of the urgent need for reduction in the appliance tax and the urgent need for active support of the program. You also kept your readers well informed regarding the status of excise taxes during the legislative processing of the Excise Tax Reduction Act of 1954.

In behalf of the NEMA Excise Tax Committee, I wish to express the Committee's sincere appreciation for the excellent support which you have given to the success of the excise tax reduction program.

J. R. Poteat, Chairman
Excise Tax Committee
National Electrical Mfrs. Assn.
New York, N. Y.

Struthers Wells SERVES Amana

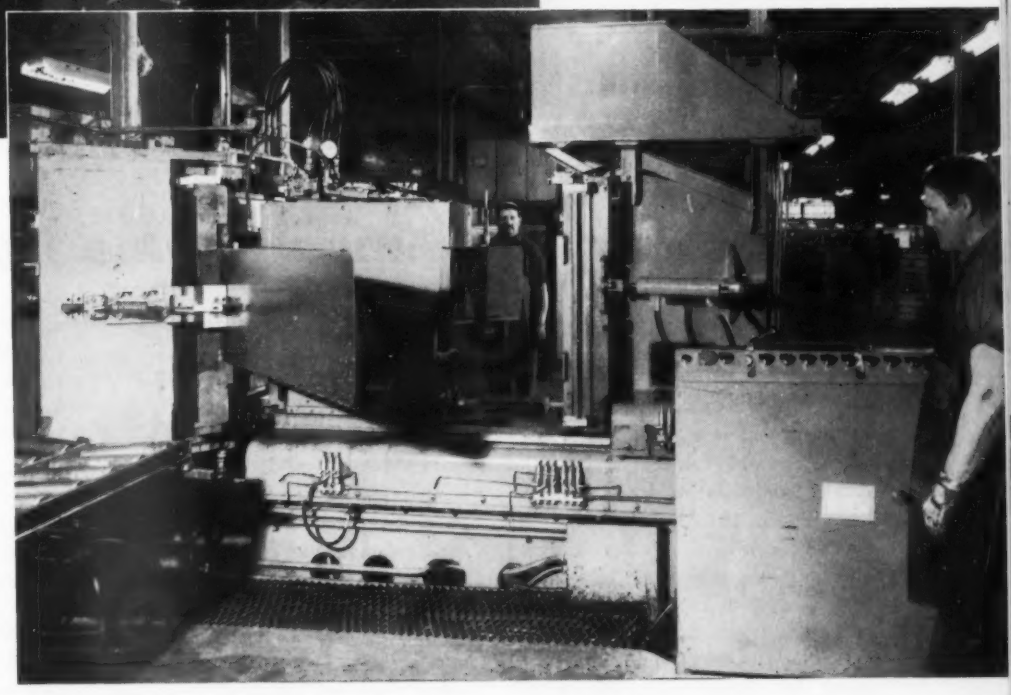


Rapid, low-cost production of cabinet shells for AMANA upright freezers is provided by this

STRUTHERS WELLS 400 TON HYDRAULIC PRESS

and

DOUBLE-WING TANGENT BENDER with Auxiliary Bender



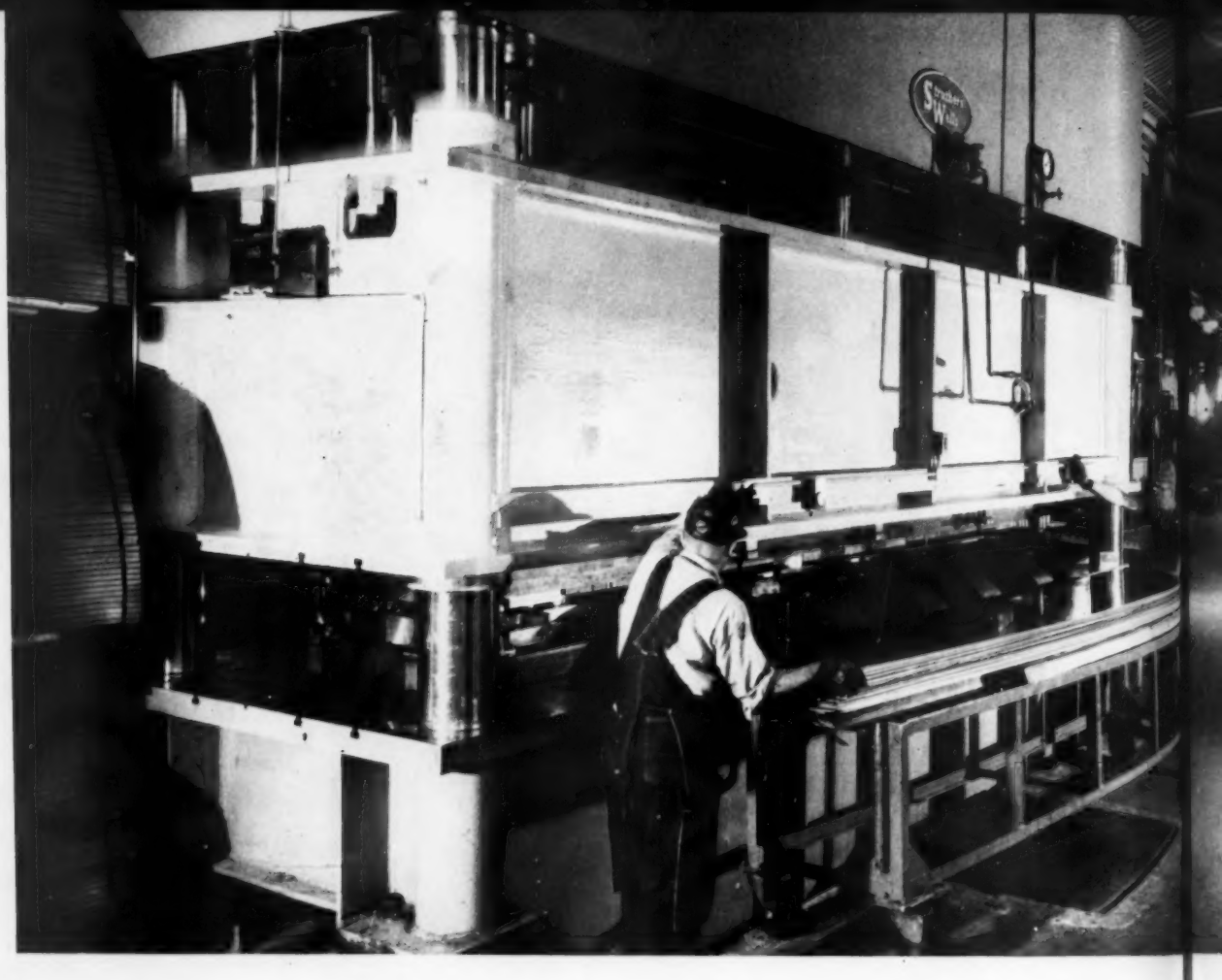
Struthers Wells sheet metal forming equipment cuts costs and speeds freezer wraparound production for Amana Refrigeration, Inc. Sized sheets are notched and punched for hinges and mounting holes by a 400-ton press, prior to roll forming. Tooling is adjustable for various shell sizes. The U-shaped wraparound is produced by a Double-Wing Tangent Bender with auxiliary bender unit, which forms the crown, the radius bends and the bottom inbent flanges in a single operation. ● Write for detailed information on the complete Struthers Wells line of packaged metal forming equipment.

MACHINERY DIVISION

STRUTHERS WELLS CORPORATION

TITUSVILLE, PA.

Offices in Principal Cities



Fabricating the Amana home freezer

first in a series of articles covering plant facilities designed for producing home freezers at a rate in excess of 1000 per day

THIS year marks the 100th anniversary of the founding of the Amana Colonies in Iowa. It also marks the 20th anniversary of Amana's entrance into the refrigeration business. Of prime importance to the subject matter of the series of articles to appear in *finish* is the fact that, in early 1954, Amana Refrigeration, Inc. completed a $3,500,000 expansion program which places the company in a leading position with respect to production facilities to successfully compete for the increasing home freezer market.

More than 75% of the equipment in the 300,000 sq. ft. plant was purchased and installed after the expansion project was begun. All other equipment in the plant was moved and re-arranged so that the present plant is virtually a new one, and is set up for straight-line manufacturing operation.

For over two years the company has been working on a new Stor-Mor home freezer so that the plant equipment, tooling and plant rearrangement could be planned for the new line of products.

All materials flow forward in the plant in a straight line, from the steel processing department to sheet metal fabrication, metal finishing and painting, to main assembly lines, testing, crating and shipping.

Processing coil stock

The sheet steel used in the production of Amana products is purchased in coils, so that the first operation in connection with fabrication is the processing of the steel through a department which houses slitting, shearing and leveling equipment.

Freezer cabinets are notched, trimmed and pierced on this 400-ton hydraulic press which was designed to handle a flat piece of steel 20 feet long. The die used on this press to handle the outer shell for the 19 cubic foot freezer is 16 feet long and weighs 12 tons.

The company's plant executives feel that this ability to handle steel in coils gives the plant a flexibility to adjust to the varying needs of the plant without affecting continuity of operations. Up to 1500 tons of steel are stored in the plant, ready to move into fabricating channels. Both steel and aluminum supplies are stored well in advance of production requirements in accordance with production planning figures.

An overhead crane is used to unload carload shipments of coils which arrive by both rail and truck. The 10-ton crane operates on a 75 ft. track, crossing the entire steel handling department. The gauges used range from 14 to 26 gauge cold-rolled steel. Freezer cabinets, doors, room air conditioner cabinets, bases and hundreds of other large and small parts for the company's products are fabricated in the plant in steel. Freezer liners and shelves are fabricated of aluminum.

The slitting line

The slitting line is designed to furnish re-coiled steel up to 52 inches in width. Through the use of the slitter's multiple knives, as many as a dozen coils can be slit simultaneously from a single mill coil. The slitter handles 500 ft. of steel, or about 3,000 pounds, a minute. Rewound coils are stocked ahead of fabrication. As the production steel is rewound into coils, the edges, which are trimmed from the mill coil, are rewound into 200-pound balls on a scrap baller. These balls of scrap are then picked up by lift truck and transferred to storage for shipment.

Recoiled slit steel is ejected hydraulically onto a "buggy," and then moved by overhead crane to the shearing and leveling line.

At the shearing line, a synchronized "guillotine flying shear," with a 54-inch blade, cuts the sheet to the desired length, with an accuracy of 1/32 inch — cutting at the rate of 175 feet per minute.

Length of the sheared sheets vary from a 20-inch long lower door panel for the freezer to a 172-inch long steel cabinet wrapper for a 19 cu. ft. freezer. Sheared sheets feed onto a 20-ft. belt conveyor which, in turn, feeds a roller leveler. The three operations — the uncoiler, the shears, and roller leveler — are synchronized to operate from a single control station. A photo-electric cell controls the feed of the steel from the uncoiler to the

FACTS ABOUT THE EXPANDED AMANA REFRIGERATION PLANT

Expansion cost — a $3,500,000 expansion program doubled the size of the plant and tripled its capacity for the production of home freezers and room air conditioners.

Plant area — the Amana plant has 300,000 sq. ft. of floor space. 75% of the equipment housed in this space has been purchased and installed since the expansion program started in 1953.

Presses — 8 large high-speed presses, in the $100,000 range, were installed to form cabinets and doors for the new Stor-Mor freezers. Ranging from 200- to 600-ton capacity, the presses are designed to fabricate unusually large sheets.

Finishing department — employs an electrostatic painting system for painting freezers in two different colors.

Steel processing department — has slitting, shearing, and leveling facilities for processing coil stock.

Sub-assembly — three principal freezer sub-assembly lines make liners, doors, and condensing units. (Sub-assemblies for air conditioners are spaced along the main assembly line.)

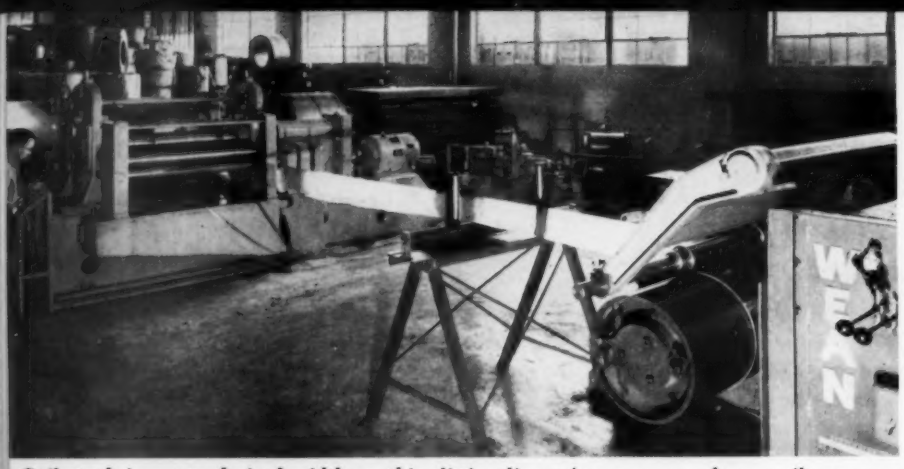
Final assembly — two complete assembly lines turn out freezers; a third produces room air conditioners.

Materials handling — conveyors of all types in the expanded plant total 7,200 feet.

Shipping and handling — enclosed loading dock provides for 16 railroad cars.

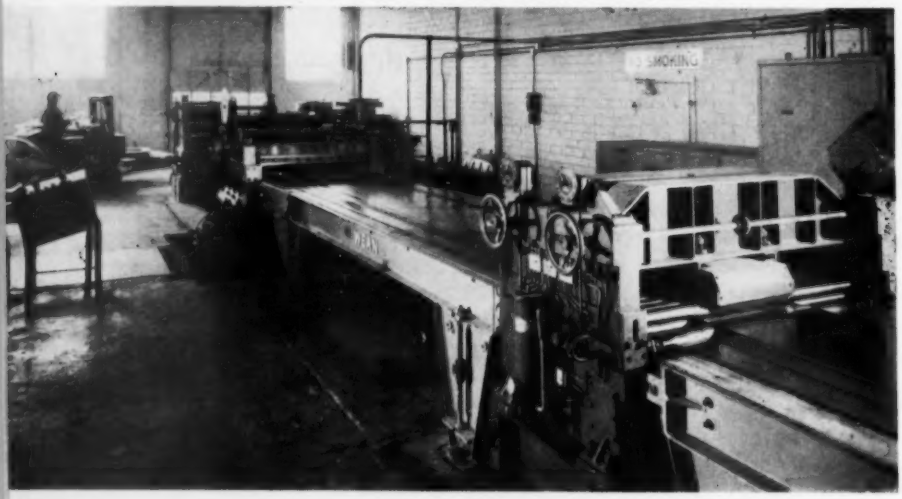
Raw material consumption — quantities of typical raw materials required for a *year's* operation in the new plant include:

24,000,000 pounds of steel
4,000,000 pounds of aluminum
24,000 feet of copper, steel and aluminum tubing
26,000,000 board feet of fiber glass insulation
200,000 gallons of paint and enamel



Coil stock is cut to desired width on this slitting line. As many as a dozen coils can be cut off a single roll at the same time, and rewound at the right. Slitter handles 90 tons of steel an hour. Scrap "baller" in background reclaims cut-off ribbons of steel.

Steel is cut to desired length and levelled in this operation. Coil is cut by the shear in the background. Flat pieces move to roller leveller in foreground. All three operations — uncoiler, shear and roller leveller — are synchronized and operated by man at control station. Shear line handles up to .075 thick steel.



shear, to insure a uniform flow rate.

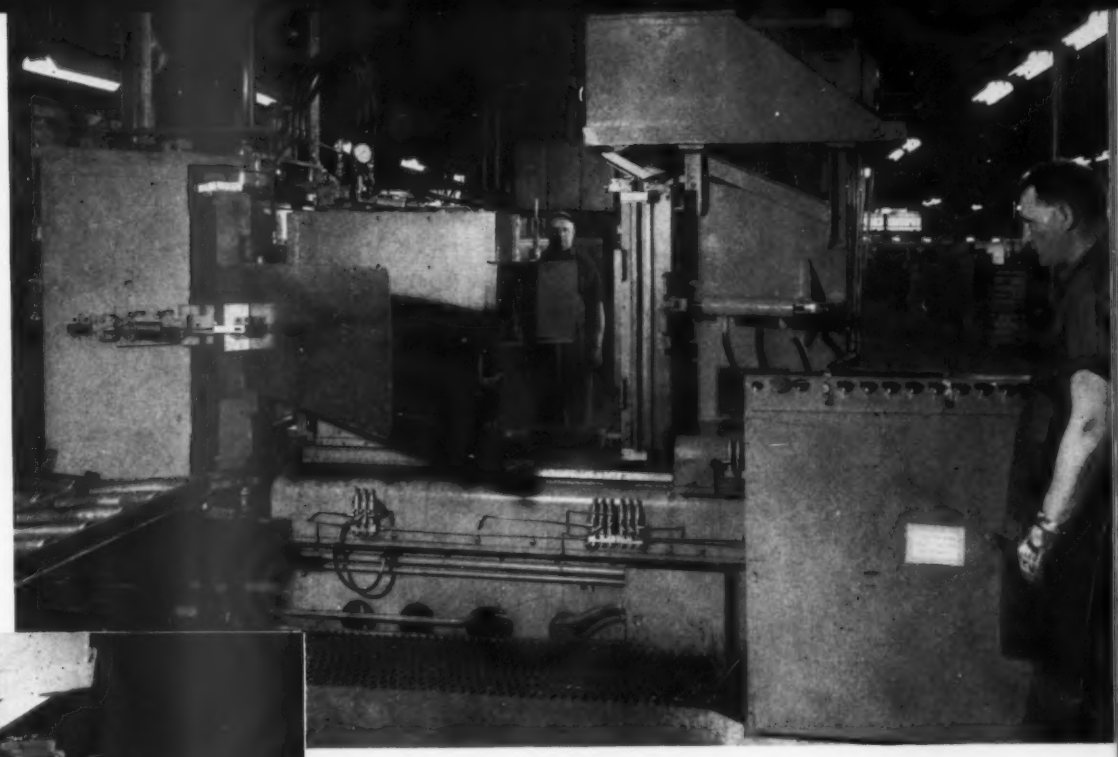
Cabinet fabrication

One fabrication line which is devoted exclusively to freezer cabinets has a lead press (400-ton hydraulic) which was designed especially for the job. In a single operation this press handles all of the notching, trimming and piercing of the 14¼-foot long sheet required for the 19 cu. ft. freezer cabinet. The press will handle a sheet up to 20 ft. in length. The die required for the 19 cu. ft. cabinet is 16 ft. long and weighs 12 tons. Two operators are required at this press, so, for a safety factor, each must hold both hands on starting buttons before the machine will operate.

From the 400-ton press, the fabricated freezer cabinet sheets feed at the rate of 75 per hour onto a roller conveyor feeding a roll former. The roll forming machine, incorporating 14 rolls, produces a triple flange on the edge of the sheet which will form the front, and a single flange on the edge which will join the cabinet back. The same machine is also used for flanging outer shells for chest type freezers.

From the roll former, the flanged sheets are carried on a roller conveyor to a tangent bender, for forming the upright freezer cabinet shape. After the double wings of the tangent bender form the cabinet, a tail bender

Cabinets upright freezers ed by 14 stands on form



A flat piece of steel is formed into a freezer cabinet shell on this double-hinged tangent bender, operated by pushbutton by man at right. Each cabinet receives four bends in 45 seconds.

Right angle bends on the bottom of the freezer cabinet are formed by this tail bender part of tangent bender.

forms right angle bends on the bottom of the cabinet. This machine completes four bends in 45 seconds, and can handle 75 freezer shells per hour.

The formed cabinet shells proceed to a hydraulic piercing machine, which pierces 30 holes in the triple flange of the cabinet shell, for the attachment of breaker strip sections.

The next step is the welding of the back to the wrap-around cabinet. The welding unit applies two sets of 38 spot welds, and then hydraulically ejects the fixture on which the cabinet rests. This welder is designed to turn out 75 cabinets per hour. (This single welding operation replaces 100 machine screws which were used to attach the back to the cabinet in older models.)

The bottom of the cabinet and all brackets, including feet, mullions, and corner gussets, are then attached with 88 spot welds. Three movable overhead welders, each equipped with two electrodes, handle these operations.

After bolt holes for the door hinges are pierced in the flange of the cabinet, it is inspected for any defects in the fabricated metal part before it is released for delivery to the paint finishing line. Any scratches or dents are removed by air grinders at a metal finishing station.

Door fabrication

Forming the door for the 19 cu. ft. freezer requires the use of a 600-ton hydraulic press and four operators. When this press is in use, all four operators must have both hands on starting buttons in order for the unit to respond.

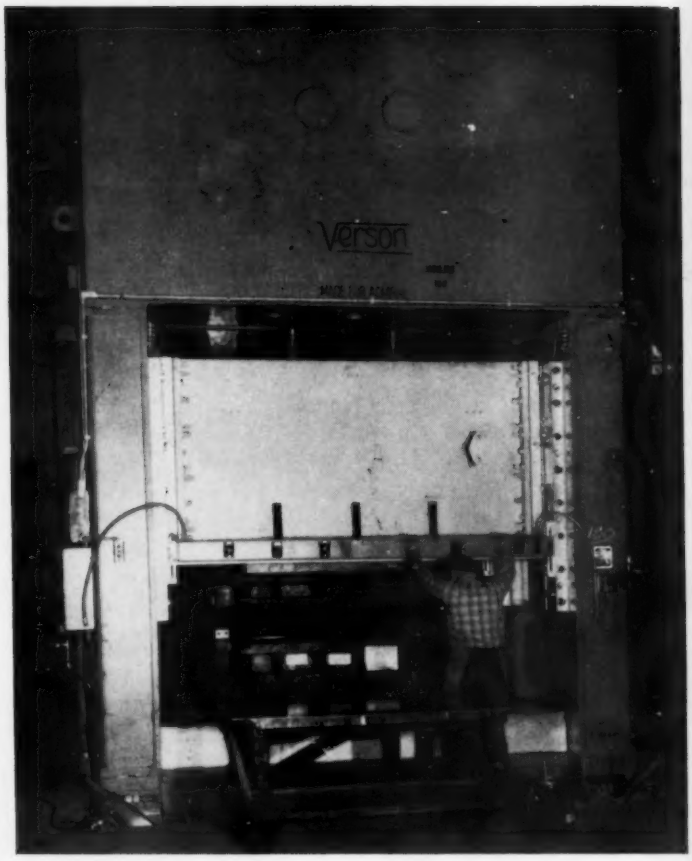
The die for the stamping of the unusual shape of the Stor-Mor door weighs 18 tons. It is transported within the plant by a 30-ton capacity gas-electric truck, equipped, incidentally, with power steering. After the application of drawing compound to a sheet 49″ x 71½″, the large door is formed in the double-action hydraulic press.

After the initial forming operation, the freezer door moves through three 350-ton mechanical presses for trimming, piercing and flanging. Each press turns out 240 pieces per hour. A 90-ft. conveyor is used to serve the presses for these operations.

A special machine built by the die manufacturer is used to "de-bow" the formed door and assure absolute straightness. Eleven holes for mounting the escutcheon are then pierced on a special hydraulic machine. Then, one of the 350-ton presses cam-pierces holes for the breaker frame screws.

Four corner gussets and latch

MADE FOR ADMIRAL



THIS Verson FULL ECCENTRIC PRESS produces refrigerator doors

AT Admiral Corporation's Midwest Manufacturing Division in Galesburg, Illinois, all heavy press and press brake equipment is of Verson manufacture, especially for Admiral. The press illustrated above is typical—a 600-ton Verson full eccentric with two points of power application to produce large pieces such as the refrigerator door shown. Other full eccentrics in the Verson line-up at Admiral range from 200 tons to 600 tons capacity.

For all types of forming of large or small pieces for ranges, refrigerators, freezers, space heaters or what have you, Verson full eccentrics provide the five essentials of press design—strength, rigidity, endurance, accuracy and power. For the user of our presses, it means better stampings at lower overall cost.

Whatever you produce that requires stampings—it will pay you to find out what we can offer you. For recommendations, send an outline of your requirements.

A Verson Press for every job from 60 tons up.

Verson

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

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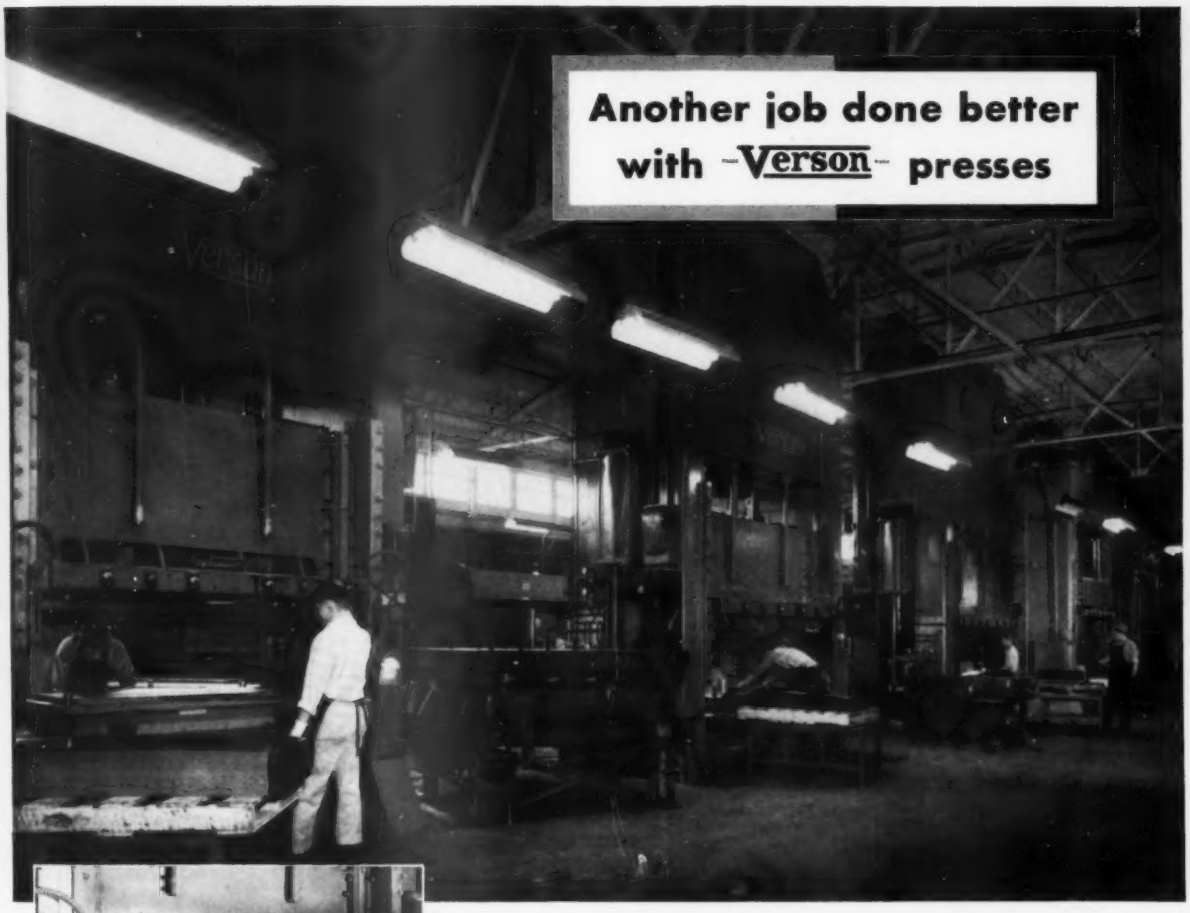

Above is a close-up of compressor mounting plates as they come from one of the large Verson mechanical presses at Amana.

Basic data on the entire Verson line is presented in Catalog G-53. Write for your copy, today. It may be the first step towards more efficient production of stampings.

A Verson Press for every job from 60 tons up.

Amana's New Facilities Feature this Verson Line-up

Prominent in the expanded stamping facilities of Amana Refrigeration, Inc., is the line-up of big Verson presses shown above. Among the biggest in use at Amana, they include four 350 ton full eccentric mechanical presses and a 600 ton hydraulic press. In addition Amana also uses one of Verson's smallest presses, a 150 ton open back inclinable.

Like progressive manufacturers of metal products everywhere, Amana has taken advantage of Verson's press building know-how to assure themselves of quality, efficiency and economy in the production of metal stampings.

The Verson line is complete, comprising virtually all types of presses and tooling. If you make anything requiring metal stampings, it will pay you to consider Verson.

Verson TRADE MARK

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

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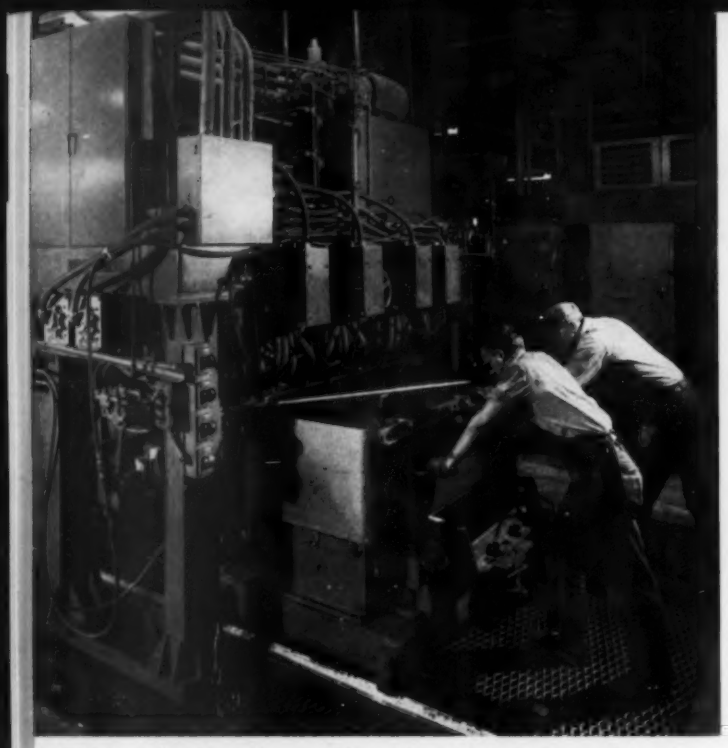


Thirty-eight electrodes on this welder attach back to cabinet in less than a minute. After two sets of 38 spots are applied, the fixture (being rolled into position here) is ejected hydraulically.

Overhead welders fasten bottom, feet, mullions and the co... gussets to an upright freezer cabinet. Nearly 100 spot weld... applied in this operation.

brackets are then welded to the door on a turntable fixture, which is designed for spot welding to close tolerances. Following inspection, the door then goes to the metal finishing department in preparation for painting.

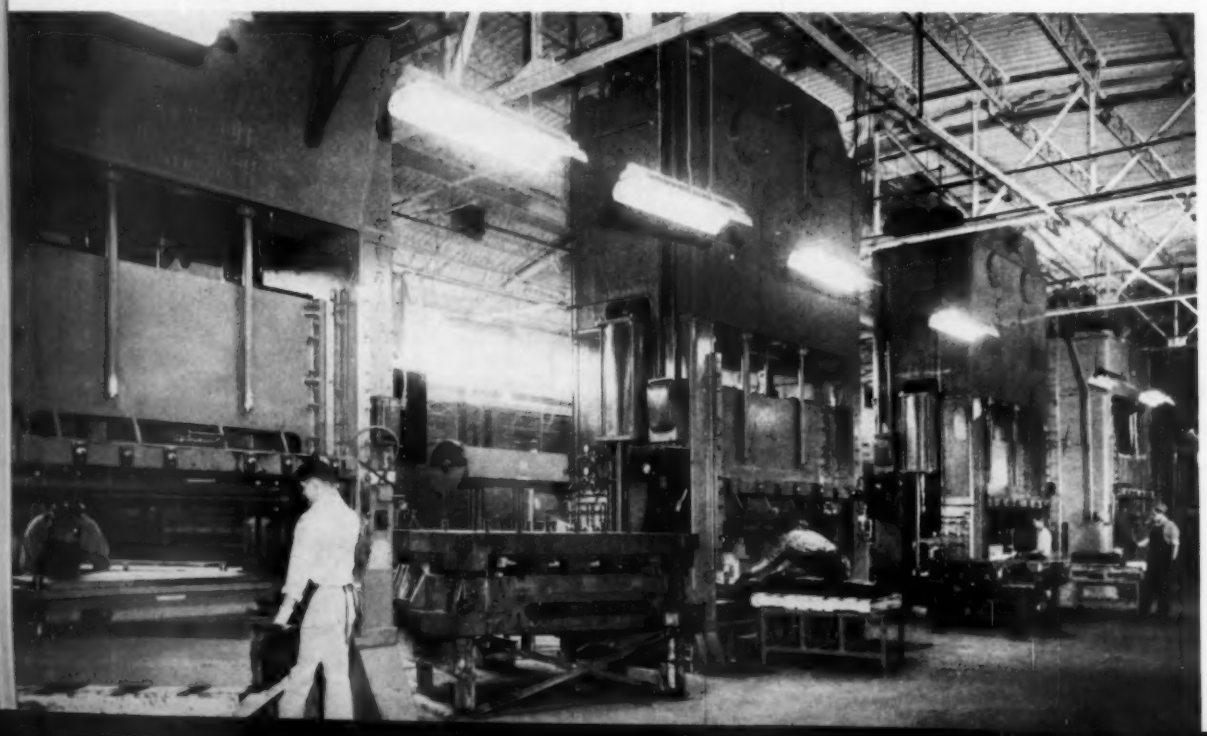
Component fabrication

In addition to the 400-ton hydraulic press used for cabinet fabrication, and the 600-ton hydraulic used for forming the door for the large upright freezer, there are six other large presses in the sheet metal fabricating department. These are conventional straight-side mechanical presses. This group of presses is employed to turn out backs, bottoms, mullions, chest freezer outer cabinets, chest freezer lids, and many other similar parts. (Air conditioner shrouds are also fabricated by the same equipment.)

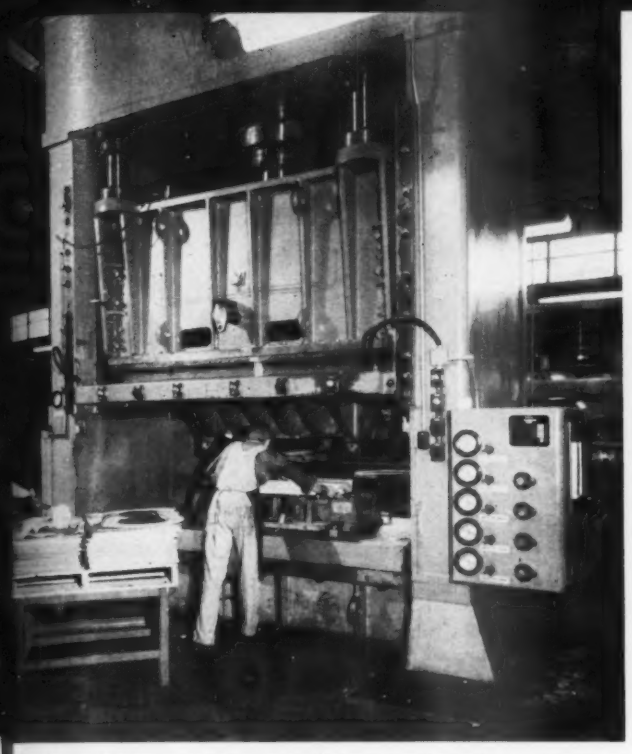
As a typical example of component fabrication, a 200-ton press cam-flanges lids for chest freezers and blanks and forms a variety of other pieces at a rate of 240 an hour.

Punch presses and brakes

In the punch press department, 22- to 150-ton presses bend, form, pierce, form and blank brackets, breaker frame clips, tubing frame clips, gussets and many other small light-weight parts required in volume. Each of 12 presses produce from



In overall vie... sheet metal ... ment can be se... of the high... presses used ... and form pa... freezers as we... air conditio...



...er door of 15 cu. ft. freezer is drawn on this 600-ton press. ...is is first of four operations on the triple-action press which turns out 200 such pieces every hour.

On special door welding fixture, four corner gussets and the door latch are welded firmly into position.

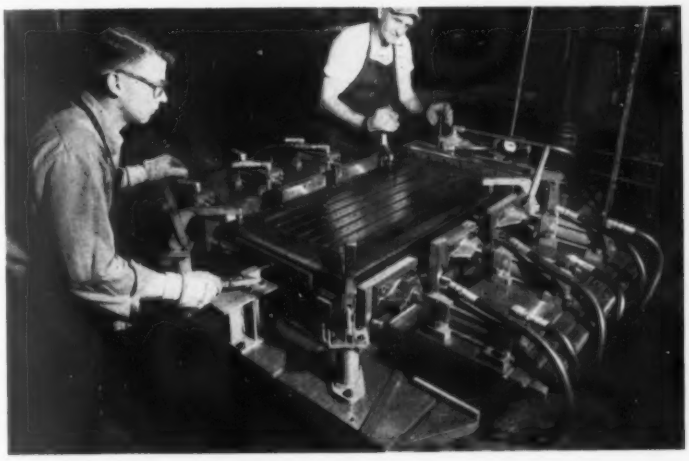
400 to 1,000 pieces an hour.

A line of seven press brakes pierce liner sheets, form tubing clamps, form 90-degree bends in aluminum liner sheets, tops and bottoms, air conditioner evaporator shrouds, partition panels, air conditioner outer cabinets, and other parts.

The engineers and plant men responsible for the laying out of the fabrication line at Amana had the advantage of knowing the exact units they would be required to produce, and then setting out to get the equipment best suited to a synchronized fabricating line. By combining standard press equipment with specialized fabricating equipment designed for the job, it was possible to take maximum advantage of equipment capacities in most instances, while at the same time including them in a smooth-flowing production line.

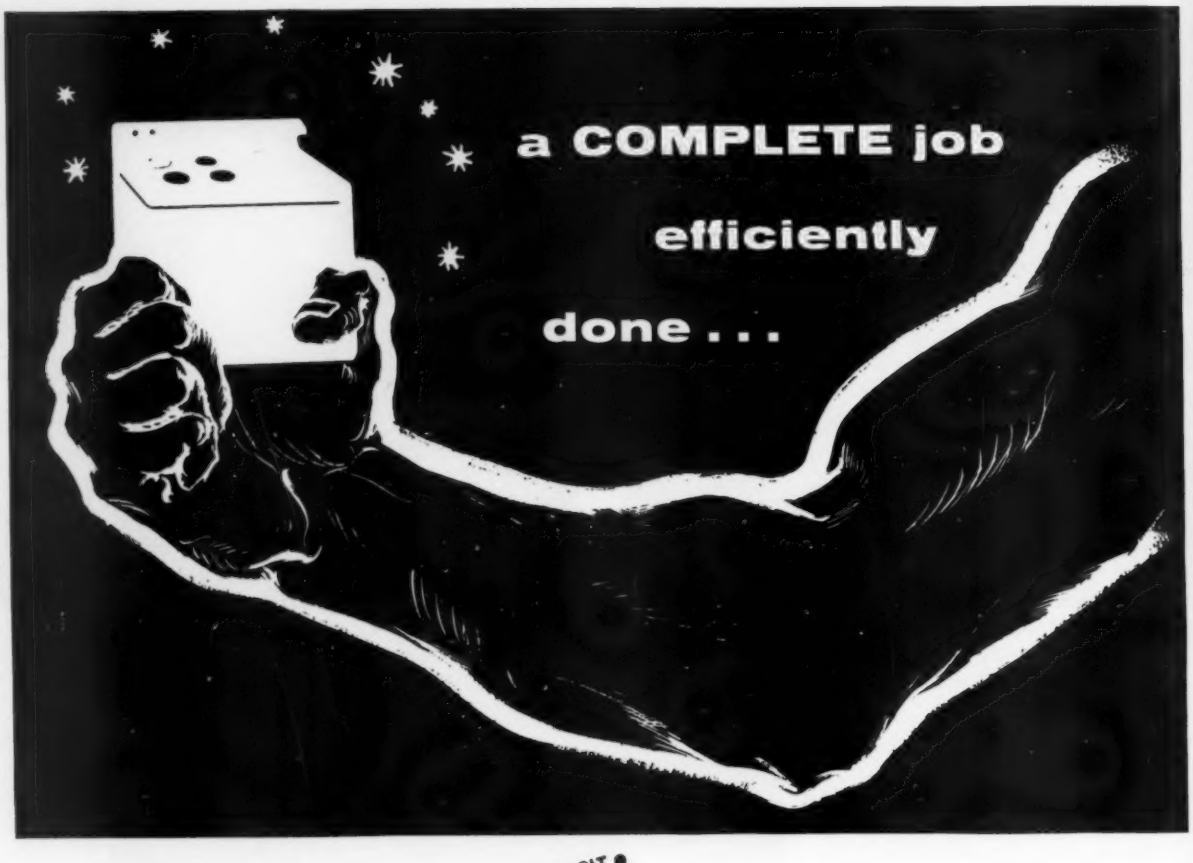
The second article in this series describing Amana facilities will cover metal preparation and paint finishing. Article No. 2 will appear in the September issue.

Sub-assembly and final assembly operations as well as packaging and shipping will be covered later.



Hydraulic piercing machine pierces 12 holes and 35 slots for the attachment of shelves and dividers in upright freezer inner door liner.

On this metal finishing line, dents or scratches are removed from freezer doors and cabinets.



VITREO facilities help you meet the ever-growing demand for porcelain enameled parts by:

1. Acting as a source for stamping as well as enameling.
2. Enameling stampings of your manufacture.
3. Supplementing your own enameling plant.
4. Possibly saving die costs.
5. Quickly solving your color problems.
6. Keeping transportation costs low. (By operating our own trucks, we can often pick up and deliver at the same time, thereby saving most of the cost of one-way transportation.)

From where you stand, the need for a complete job of fast, economical fabricating and enameling is of paramount importance.

From where we stand, our job is to fill this need . . . to turn out the best enameled parts available and to offer the customer the facilities of complete fabrication as well.

VITREOUS not only enamels parts which you fabricate, we also have a large, well-equipped stamping shop if you want complete parts.

VITREOUS is a source upon which you can depend for quick delivery on time, for regular day-by-day production, or for fill-in work to relieve over-taxed plant facilities.

Plan... for the Lifetime Finish

VITREOUS STEEL PRODUCTS CO.

BOX 1791 • CLEVELAND 5, OHIO • (Factory at Nappanee, Ind.)

In they go

Out they come

Year after Year on
Inconel *Hanger Rods*

Have you tried Inconel® for hanger rods?

For long run economy in this service, you can depend upon Inconel.

Within standard enameling temperature ranges (1475 to 1550°F.) and on up to the range where high temperature ceramic coatings are applied (1850°F. approximately), Inconel delivers excellent heat and corrosion resistance. It resists oxidizing and other corrosive conditions common in enameling operations.

At those temperature levels, Inconel retains high creep strength. Even after years of continuous operation, Inconel rods of proper design show no stretch.

A change to wrought, light-weight Inconel rods can mean lower fuel costs, too. For with less dead weight in the furnace, it takes less fuel to get to heat and stay there.

What's true of Inconel for drop rods, is equally true for burning tools and furnace parts.

So if heat and corrosion are creating problems with items of this type, see what Inconel can do. You can get more information by writing for "Keep Operating Costs Down . . . When Temperatures Go Up." It's free and a useful booklet to have. For detailed technical assistance, call on Inco's Technical Service Section.

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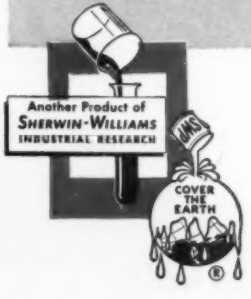
For full details, contact your Sherwin-Williams Industrial Representative, or write The Sherwin-Williams Co., General Industrial Division, Cleveland 1, Ohio.

Panel at left, coated with new KEMCLAD HI-HEAT ENAMEL, shows no discoloration after 16 hours exposure to 450° F. Panel with conventional, alkyd-type, heat-resisting finish is discolored after 16 hours at 375° F.

- PROVIDES MORE PROPERTIES of silicones, at lower cost
- NON-YELLOWING at temperatures to 500° F.
- HIGH FLEXIBILITY . . . adhesion . . . grease resistance . . . gloss retention



SWP COVER THE EARTH

SHERWIN-WILLIAMS
INDUSTRIAL FINISHES

The steel mill goes modern

blooming mill features air conditioned roller's pulpit with locker room facilities

THE Youngstown Sheet and Tube Company, with complete integrated steel plants in both the Youngstown, Ohio, and Chicago districts, recently completed the largest steel mill expansion in the Chicago district since the break of the century. The major increase in facilities, involving an investment of $165,000,000 or more, was at the company's Indiana Harbor Works, East Chicago, Indiana, twenty miles south of the Chicago loop on Lake Michigan.

The expansion program at Indiana Harbor Works was launched late in 1950 and the last unit completed, the cold-reduced sheet mill, was placed in operation February this year.

Major units installed were: a new battery of 75 coke ovens, with by-product facilities; No. 3 blast furnace with a capacity of 1450 net tons per day; 675-foot extension to the ore dock, a new ore bridge, two ore unloaders; 3400-foot water intake tunnel, 200 feet underground; eight 275 ton open hearth furnaces; 45" blooming mill; 54" hot strip mill expanded in both the rolling and finishing facilities, and a new cold-reduced sheet mill which includes seven large buildings covering 20 acres.

Above: View of new 45-inch blooming mill. The white section with personnel is the roller's pulpit, one of the most modern in the world, with locker room facilities, cool water fountain, and air conditioning.

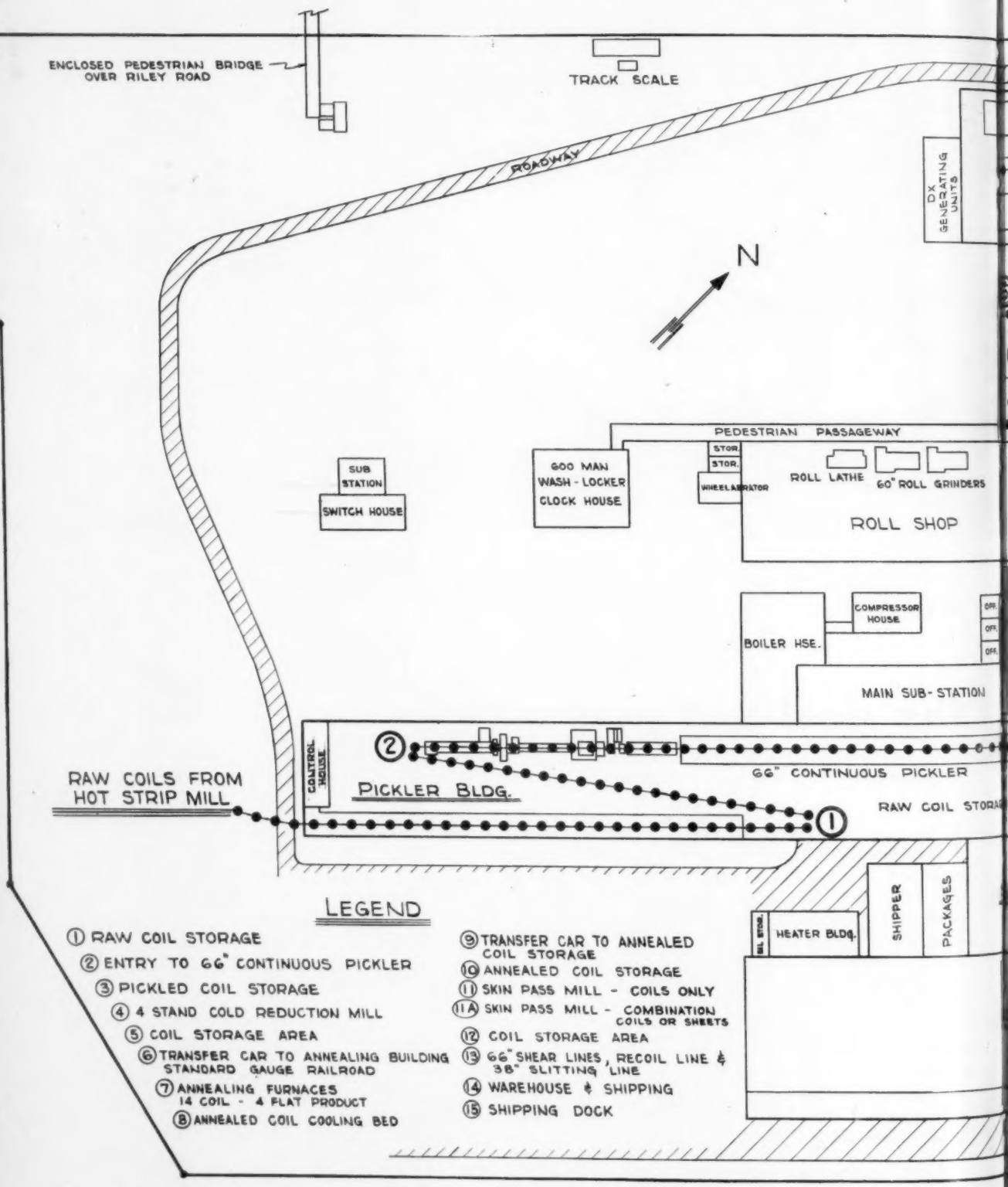
The new facilities at Indiana Harbor Works has doubled its ingot capacity until now it produces practically fifty per cent of all steel produced by the company.

Alternate type of lights

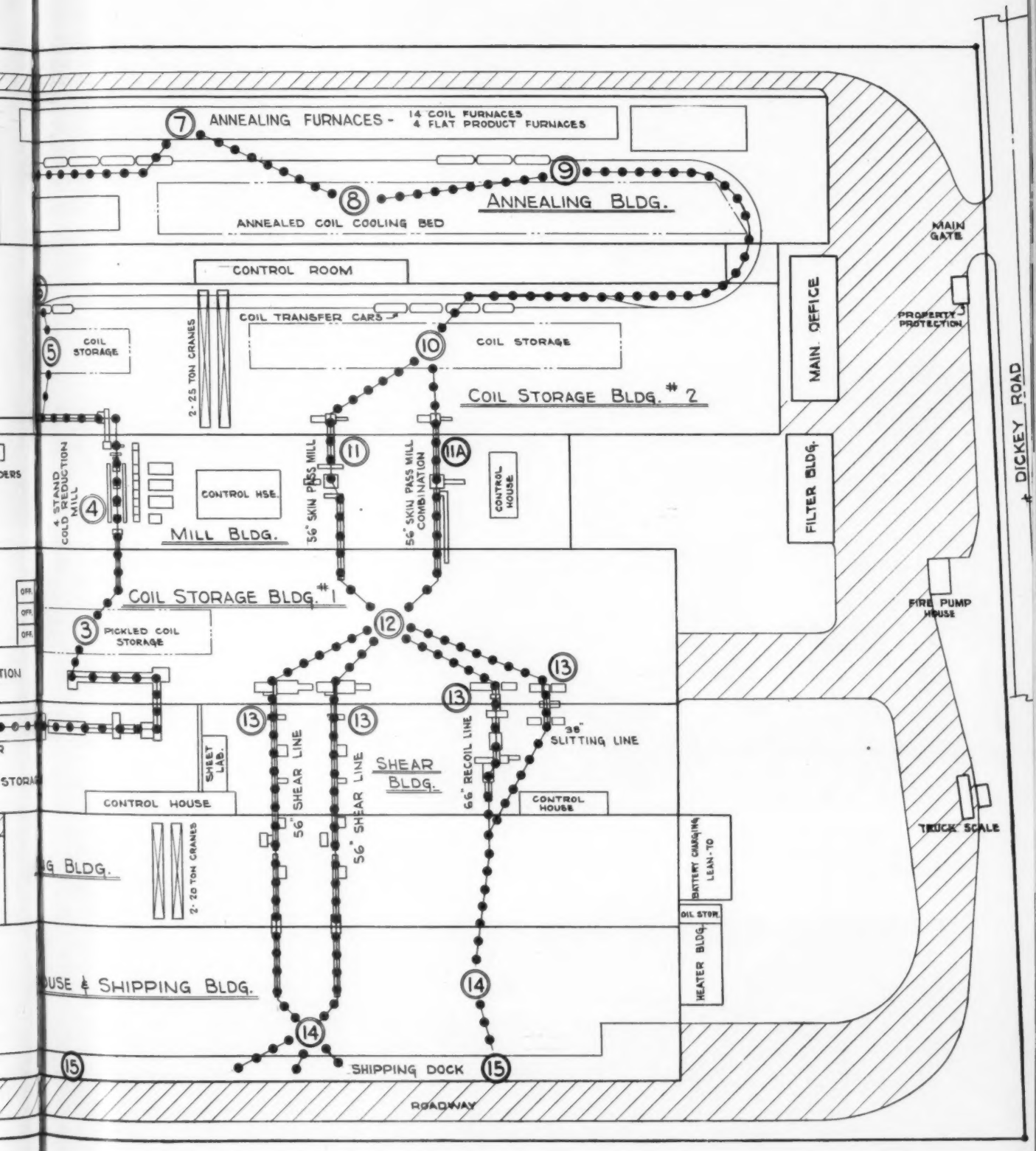
All seven buildings of the cold-reduced sheet mill are equipped with alternate overhead lighting of 1000 watt mercury lights and 1000 watt incandescent lights. The reason for using both types of light is to obtain a white light.

The alternation of the two types

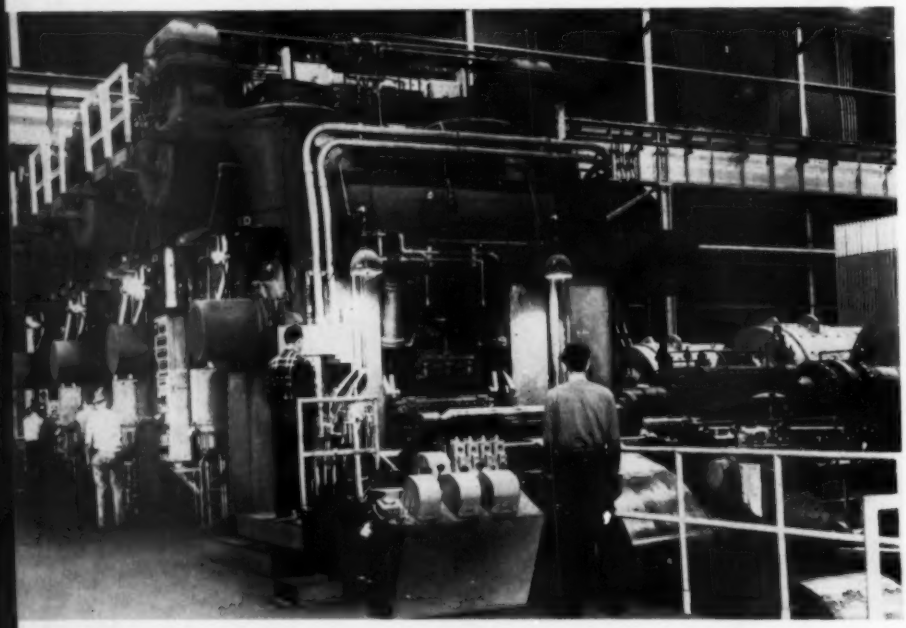
A general material flow diagram for new



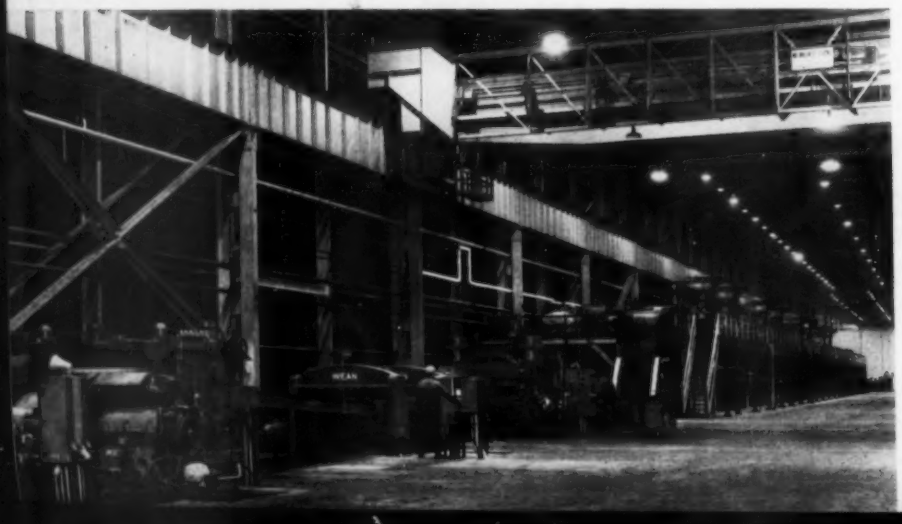
duced sheet mill



Above: New 45-inch blooming mill, with modern air conditioned roller's pulpit at right. The mill is in the process of rolling a white hot ingot weighing about 24,000 pounds into slabs for the hot strip mill. This mill has a capacity of 300 net tons an hour.



Above: Four-high, four-stand cold-reduced sheet mill at Indiana Harbor Works was put into operation in February. Mill has a maximum speed of 3500 feet per minute. It is supplied with coils rolled in the hot strip mill and processed through the new pickler line.



of lights has proven very desirable for lighting working areas.

Ventilation and air conditioning

Large air conditioning units are located throughout the various departments of the cold reduced sheet mill to deliver hot air or cold air, as the weather demands, for electric motors and electrical control rooms. Air is delivered from a centrally located filter building.

The pickling line has an exhaust system to remove fumes from the working area.

The warehouse and storage building has atmospherically controlled heater units to keep the moisture content down.

The annealing building has forced air cooling from the basement for continuous cooling of the 54 bases of the annealing units.

There are ventilating fans in the gable of each of the seven buildings for warm weather ventilation and removal of diluted air.

Cranes and tractors

There are fifteen overhead cranes in the seven buildings of the cold reduced sheet mill.

There are only ten tractors in this large plant covering more than twenty acres.

Conveyors

Although the operations are spread over a large territory, conveying equipment is practically all localized at entry and delivery ends of production units. Some, although short, carry through from one building to another, resulting in efficient handling.

Trackage in plant

There are five miles of standard gauge railroad tracks serving the cold reduced sheet mill.

Left: Continuous pickler line for steel coils is equipped with an electric butt welder at the entry end to weld coil ends together for continuous pickling. At the delivery end the sheet is side trimmed and croppings are conveyed to a scrap pit by an uphill electrical vibrating conveyor.

nealing unit in cold reduced sheet mill. Furnaces in right foreground are for annealing flat products. The other 14 cover-type radiant be annealing furnaces are for coils. Capacity of each is 300 N.T. per charge with a 4½ to 5 N.T. annealing rate per hour. The coils e covered and the furnaces hoisted by cranes and placed into position over the cylindrical covers. Company coke oven gas is used as furnace fuel, and a special gas manufactured from natural gas is used as protective atmosphere inside inner annealing covers.

Elevated pickling equipment

The continuous pickler line consists of elevated tanks, two tanks, 87 feet long and two, 85 feet long. The cascade method is used where the acid is charged near the delivery end and runs back to the entry end, the tanks sloping that way.

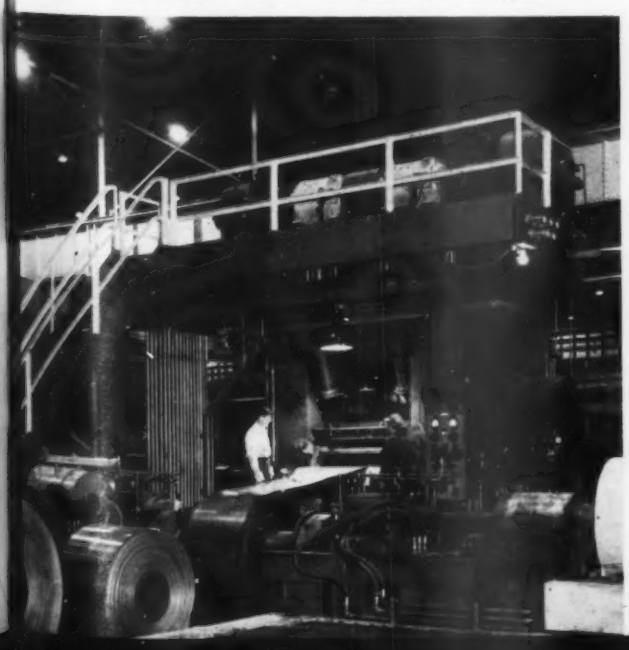
The acid bath removes all scale from the steel. The steel then passes through a cold water rinse, then a hot water rinse, and then a drier before entering the trimmer shears, cropping shears, and upcoiler.

Shear line

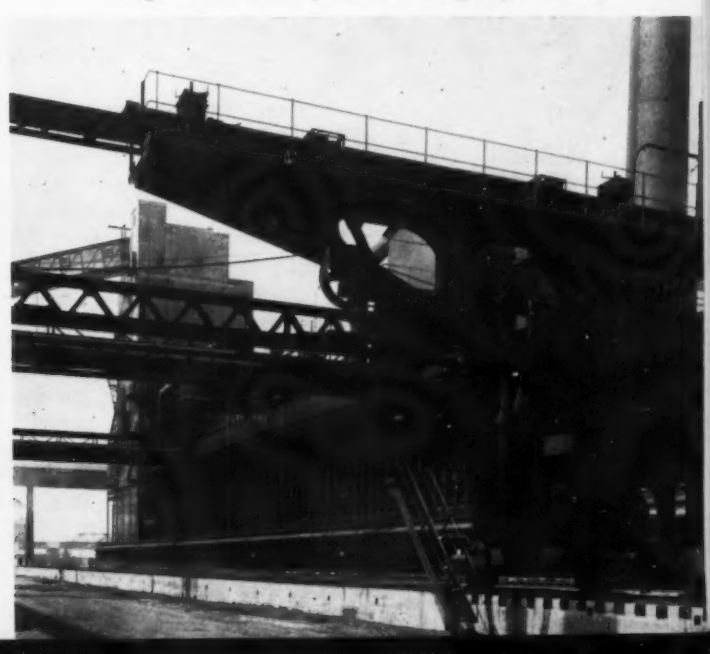
There are two 50-inch coil shear

to Page 66 →

of 56-inch single-pass four-high temper mill to process coils r being annealed. Adjacent to this mill is another 56-inch per mill to process either coils or flat products. These stands will handle 50,000-pound coils at a speed of 3,350 fpm.

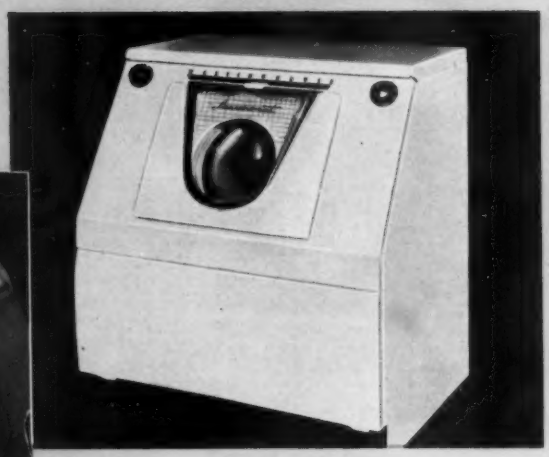


Battery of 75 coke ovens at Indiana Harbor Works produces 1200 N.T. of blast furnace coke a day with an 18-hour coking period. Each oven is 13 feet high, 42 feet long, and 18 inches wide. Eighteen net tons of coal are charged per oven.



EPON® RESIN does it!

WESTINGHOUSE Laundromat gets a tougher, more corrosion-resistant primer at much lower cost!



Laundromat has a baked Epon, flow-coated primer formulated by Pittsburgh Plate Glass Company. Film uniformity calls for only the briefest scuff sanding before application of the white enamel top-coat.

HERE'S HOW...

The protective finish on a washing machine is exposed to severe conditions during its service life. It must, for example, withstand abrasion, impact, attack from highly active alkalies and detergents.

Recently, Westinghouse engineers adopted a greatly improved finish for Laundromat components, using a new *primer* based on Epon resin. Applied by flow coating, the primer is only one-third the thickness of previously used primers. Tests have established a *three-fold* improvement in coating durability under severe conditions . . . and application costs have been materially reduced.

Laundromat components receiving the new Epon resin primer are: top, front, door, lower front panel, bracings, clamps and bottom pan. Some interior surfaces have *Epon primer as their only finish.*

If you need a protective finish like this in your paint program, ask your supplier for Epon resin-based paints and enamels. These formulations have excellent adhesion, high resistance to impact and abrasion; outstanding resistance to moisture, heat and corrosive atmospheres.

• • •

Write for the brochure "Planning to Paint a Pyramid?" on the variety of applications of Epon resins in surface coatings. You may call on our sales offices for names of manufacturers who sell Epon resin coatings.

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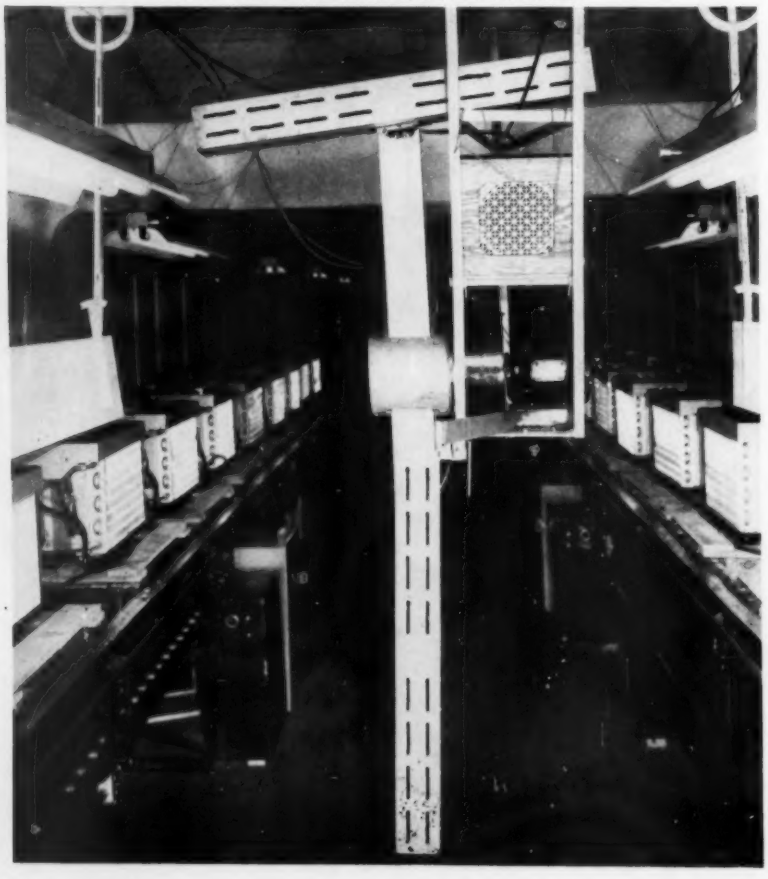
Accelerated performance testing of window-type air conditioners

a description of how Gibson tests each production unit in a special test chamber in which temperature and humidity are closely controlled

by E. T. Benedict • PLANT ENGINEER, GIBSON REFRIGERATOR CO., GREENVILLE, MICHIGAN

TO simplify accelerated performance testing of Gibson window-type air conditioners, we constructed a special test chamber which is 70 ft. by 12 ft. by 9 ft. high. Desired air conditions are maintained in this room by a system of heating and cooling coils and a chemical-type dehumidification unit, actuated by an air sampling device.

PHOTOS COURTESY KATHABAR DIVISION, SURFACE COMBUSTION CORP.



Performance testing, whenever possible, is done within the first six feet of this air sampling device which actuates the various phases of the test chamber's air conditioning system. By means of a 1/6 hp squirrel cage fan, this device draws 415 cfm of air through the slots in the horizontal and vertical arms, and over wet and dry bulb thermometers. The readings are recorded and actuate the system.

Testing sequence

The air conditioner units, on pallets, are placed on electrified slat-conveyors which extend down either side of the test room. The air conditioner is plugged into the belt and run for 45 minutes with a power source of ± 2 volts of rated voltage.

Air off the evaporator is blown into the center of the room, while that off the condenser is exhausted into air ducts immediately behind and above each unit. This air is used as return air in the room's air conditioning system. All air delivered to the room comes through the ceiling which is in effect one large plenum. The ceiling itself is of perforated metal on top of which paper filters are laid. There are six openings into the room, a door at each end and an opening and exit for each conveyor, shielded with a rubber blanket.

As the units advance toward the

View of specially-designed performance test room at Gibson Refrigerator's plant, looking toward the testing area in the rear. Window-type air conditioning units (on pallets) are placed on electrified slat-type conveyors extending down each side of the room. Each production unit is plugged in and operated for 45 minutes before testing. As a further check, a minimum of two units are subjected to the same tests each day in a laboratory-type test room.

testing area, at the far end of the room, thermocouples are installed in place for final 10 minutes of 45-minute run, after which the temperature differential, between inlet and outlet evaporator air, is recorded on a direct reading recorder.

Next, a wattmeter is plugged in, and current is switched through the meter. Wattage must be within specified limits per curves furnished our Engineering Department. If rejected for wattage alone, the unit is recharged with refrigerant.

The control knob is then turned to high fan speed, and the wattage is rechecked. Any fan motor not within limits is rejected. Finally, air capacity readings, temperature differential wattage, room ambient temperature and dewpoint are compared to limit curves* to determine if the unit is acceptable.

Cross-checking test room results with laboratory tests

As further checks, a minimum of two production models each day are subjected to these same tests in a laboratory-type test room. Also, a unit that has been laboratory tested is run through the performance test room. The results of these two methods of cross-checking are then compared to current production to make certain that the limit curves are correct for prevailing conditions.

Air sampling device

The air conditioning system for the test room combines control of both air temperature and moisture content. In order to actuate the various phases of the system, so as to maintain a uniform temperature and humidity within the testing room, a unique air sampling device was constructed.

This device, by means of a 1/6 hp squirrel cage fan, draws air through slots in the device's horizontal and vertical arms, and over wet and dry bulb thermometers. The readings of these are recorded, and actuate the system.

Control is now maintained ± 1°F. within 6 feet of the sampler and ± 2°F. in the area 6 to 12 feet from it. Performance testing, whenever possible, is done in the first 6 feet. These findings are further substantiated by routing checks made with thermometers on the board side rails which mark off these areas.

The test room has been operating over a year. Because the equipment has performed continuously up to specifications, maintaining control within the performance test area ± 1°F., testing has been accelerated and simplified. Standardized engineering curves are now used. Reference to these curves, with full assurance that they are accurate for test room air conditions, has reduced testing time to minutes.

This same technique should be applicable to many other appliances whose performance testing is affected by humidity and temperature.

*Limit curves are drawn up from tests performed on pilot models according to Standard 16 of the American Society of Refrigerating Engineers.

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A double conveyor line cleaning and paint finishing system in a well known mid-western aircraft plant handles all sorts of formed aluminum parts up to 15" x 20" in size. Moving at 18 feet per minute, the conveyors carry the parts through the various operations, removing grease, oil and chips prior to painting and assembly.

Among interesting design features: The arrangement of the system around the outer perimeter of the room, leaves the center clear for storage and loading and unloading operations. The zinc chromate dip tank has a refrigeration system to maintain tank temperature at 74° F., reducing evaporation of volatiles. The system is protected with CO_2 equipment and automatic paint tank dump.

As was done in this installation, Cincinnati Engineers will gladly design equipment to suit your needs. Whatever your cleaning or finishing problems, a survey costs you nothing, may point the way to substantial savings. Write today for booklet: "Finishing Systems."

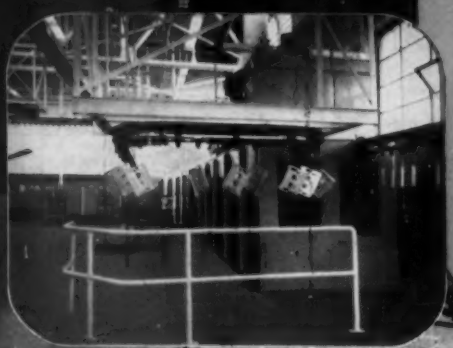
AUTOMATIC PAINT DIP and CHROMODIZER OPERATIONS:

1. Alkaline Clean
2. 1st Rinse
3. Passivate
4. 2nd Rinse
5. Hot Air Blow-Off

   All parts receive this treatment, some then go to assembly.
6. Paint Dip
7. Oven Bake

   Other parts are painted on conveyor.
8. Stripper
9. Rinse

   For empty conveyor hangers.



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Production of colors in titania opacified frits

a two-part article to guide enamel plant supervision in the successful production of wet process porcelain enameled appliances and other similar products

PART I

by Floyd J. Williams • SERVICE ENGINEER, PEMCO CORPORATION, BALTIMORE, MD.

ONE day your Sales Department, if they have not done so already, will inform you that the company is going to produce your line of products in color. In spite of your arguments against it, the company will schedule the production of colors because Sales will need these colors to compete actively in the present and future market. With the number of companies now producing color and the increasingly competitive market, your Sales Department will need colors to meet and beat competition. Accepting this fact, let's see just how much of a problem colors will be in your production.

Let me say at the beginning — colors in titanium opacified enamels are not easy to run — not as easy as whites. There is the problem of the oxides to weigh and handle, the additional storage in handling of each color, and the care required in production scheduling to prevent contamination of color with color, and white with color. Also, these colors will show up mistakes and carelessness in production much more readily than white. Mis-loaded mills and wide variations in firing treatment will readily be apparent.

Don't think of colors as an insurmountable problem or an unnecessary evil. Titanium colors are not designed to give you headaches; rather, they have been developed to fit into your normal production practice with a minimum of trouble. If your personnel are aware that colors will require more accurate control and careful handling, and are prepared to practice it, you should have little trouble in fitting colors into your production schedule.

Materials

This discussion is limited to titanium opacified enamels and the colors produced in them. These will usually be the acid-resisting colors of medium strength and pastel shades which can be produced in a single covercoat application.

The frits generally used for the production of color can be classified as follows:

1. *The opaque frits* having a reflectance greater than 75%. These frits will fall in the category of the normal production whites. They have been found to be stable with colors or have been designed specifically for that purpose. Several special frits have been introduced in the past year and some of these are already in production with colors.

The advantage of these opaque frits is in the range of colors which can be developed in them and also in their high covering power. This range of colors does not include cadmium-selenium reds or near-reds such as maroons, pinks, or oranges. These particular colors have not as yet been satisfactorily developed in titanium frits. A normal application of 25 gms/sq. ft. will produce a uniform color as with the similar production whites.

These frits have some disadvantages also. Until recently, certain colors in the blue-green range tended to be unstable in production fire and turned yellowish on harder fire. Adjustment of mill additions helped in some cases, but the colors created a problem in firing to maintain a uniform and consistent color. The latest developments in opaque frits appear to be more stable with the blue-green colors, and also with the medium strength colors.

With this high opacity, more oxide is required to develop the strength of color desired. Of course, the brighter and stronger the color, the more oxide will be required to develop the color desired.

2. *The semi-opaque* frits have a basic opacity below 75%. This type of frit is a relatively recent development and is designed solely for color work.

Production experience has proven this type of frit to be more stable with colors, even the blue-greens. This will usually permit the color to be fired with the normal production whites if necessary and most colors will be as stable as the whites. Variation of mill additions has little effect on the fired color. This means that the color can be matched with the normal electrolytes used in the particular shop and no problems of set should be anticipated. *to Page 73* →

the finishing touch makes all the difference

For customer appeal, the appearance of the finish can make the big difference. And for long satisfactory service, the durability of the finish is extremely important. Only porcelain enamel will retain for a lifetime the sparkling beauty that attracted the customer in the showroom, and porcelain offers high resistance to detergents and the action of household acids and alkalies.

Modern titania porcelain enamel is a film that matches its strength with that of the steel to which it is applied. Titanium dioxide is the factor that puts porcelain in the film category. And the titanium dioxides that do this job best are TITANOX-TG and TITANOX-TG-400—the only titanium dioxides made specifically for porcelain enamels.

Consultation with our Technical Service Department will provide assistance in solving your frit problems. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Atlanta 2; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

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2358

Milling practices with high density balls

data accumulated from a survey of porcelain enameling plants

by J. B. Vernetti • FRIGIDAIRE DIVISION, GENERAL MOTORS CORP., DAYTON, OHIO

DURING the past few years, the porcelain enameling industry has been using high density balls in the milling of porcelain enamel frits.

I will present data accumulated from various users of this grinding medium. First, however, I would like to define the term "high density ball" as used in this discussion. A high density ball is a spherical grinding medium made of alumina with a specific gravity of 3.4. This compares with a specific gravity of 2.4 to 2.5 for the conventional porcelain ball or flint pebbles.

The accompanying chart shows the following data: mill size, ball charge, frit charge, type of enamel, milling time, fineness of grind, and average enamel temperature at end of milling. I will relate some of the findings encountered by the users of high density balls. You will notice for any given size of mill there is a wide range of data on the above items. Why is this possible? It must be realized that enamel slip varies from plant to plant and also within a given plant in its physical properties such as specific gravity and set up, therefore the milling conditions also vary.

A specific example

Here is one specific example that we experienced at Frigidaire, Plant No. 2.

We started our high density milling with exactly the same frit charge as we had practiced with standard porcelain balls. The net result was that we experienced an increase in the set of the enamel due to increase in milling temperature. In one of our 6 x 8 ground coat mills we started with a ball charge of 13,000 pounds made

Survey of Milling Practice with High Density Balls

Size	Ball Charge 2½"	2"	1½"	1¼"	Total	Type of Enamel	Frit Charge Lbs.	Milling Time Hrs.	Fineness	Enamel Temp.	Mill Speed
3 x 3½	1100	1100	1100	—	3300	C. Ct.	1000	2½	6.0	100	26
3 x 3½	1100	1100	1100	—	3300	C. Ct.	1000	2¼	6.0	100	32
4 x 5	—	1300	1300	—	2600	Gr. Ct.	1000	3¾	7-9	60	18
4 x 5	—	700	1900	600	3200	C. Ct.	1000	4½	0.5	94	25
4 x 5	—	700	1900	600	3200	Gr. Ct.	1000	2½	7-8	88	25
4 x 5	—	1000	1000	1000	3000	Gr. Ct.	1000	2½	5-7	—	24½
4 x 5	615	1840	615	—	3070	Gr. Ct.	1300	4½	8.0	100	24
4½ x 4½	720	2160	720	—	3600	C. Ct.	1300	7½	0.5	100	18
5 x 4	800	2400	800	—	4000	C. Ct.	1500	5½	3.0	100	21
5 x 6	1500	4100	1400	—	6000	C. Ct.	2500	10½	0.5	90	21
5 x 6	2900	2300	2300	—	7500	C. Ct.	2500	8½	0.5	90	21
5 x 6	2600	2200	2300	—	7100	C. Ct.	2500	8	0.5	90	21
6 x 4	1500	1500	1500	—	4500	Gr. Ct.	1500	3	7.0	100	23
6 x 5	2560	2560	2560	—	7680	C. Ct.	2000	2¼	3.0	100	24
6 x 5	1600	5000	1500	—	8100	C. Ct.	2500	3	3.0	96	19
6 x 5	4050	—	4050	—	8100	C. Ct.	2600	5¼	3.0	100	19
6 x 5	4050	—	4050	—	8100	C. Ct.	2600	5¼	3.0	102	19
6 x 5	4050	—	4050	—	8100	Gr. Ct.	3100	4½	5.0	92	19
6 x 5	1500	4500	—	1500	7500	Gr. Ct.	3000	4½	6.0	98	20
6 x 5	—	4300	2800	—	7200	Gr. Ct.	3100	5	5-6	95	19
6 x 5	—	4300	2800	—	7200	C. Ct.	2300	5	1-2	100	19
6 x 6	2600	2600	2600	—	7800	Gr. Ct.	2000	2¼	7.0	100	20
6 x 8	2600	7800	2600	—	13000	Gr. Ct.	4100	3½	5.0	90	19
6 x 8	3500	3500	3500	—	10500	Gr. Ct.	3000	3	7.0	100	19
8 x 6	7000	10500	—	—	17500	Gr. Ct.	6000	5	5-6	100	13¾
8 x 6	—	4500	9000	1500	15000	Gr. Ct.	6000	4	5-6	95	13¾
8 x 6	3500	9000	3000	—	15500	C. Ct.	6000	4	3.0	105	19
8 x 6	3500	9000	3000	—	15500	Gr. Ct.	6000	3½	6.0	100	19
8 x 6	1200	2300	9600	2400	15500	Gr. Ct.	6000	4½	6.5	99	19
8 x 6	7000	10500	—	—	17500	C. Ct.	5500	6	1-2	100	13¾
8 x 6	—	4500	9000	1500	15000	C. Ct.	5500	6	1-2	95	13¾

up of 50%, 2½" and 50%, 1½" balls and a frit charge of 3,700 pounds. With this combination we decreased our milling time from 5¾ hours to 3 hours. The enamel temperature averaged 98° F. We charged another 6 x 8 ground coat mill with the same amount of balls (13,000 pounds) made up of 20%, 2½", 60%, 2", and 20%, 1½" and increased the frit charge to 4,100 pounds. With this combination our milling time is 3½ hours, but the enamel temperature only 90° F — a decrease in temperature of 8° F.

Survey conclusions

From the results obtained in the survey the following conclusions can be made on the comparison of high density to porcelain balls:

1. *Grinding Time*
   - A. Ground coat milling time was reduced from 30 to 60%.
   - B. Cover coat milling time was reduced from zero to 40%.
2. *Ball Usage*
   - A. Average usage of porcelain balls was reported from 5 to 10 pounds per 1000 pounds of milled frit.
   - B. Average usage of high density balls was reported from nil to 2 pounds per 1000 pounds of milled frit.

     Majority of users reporting less than 1 pound per 1000 pounds of frit.
3. *Lining Life*

   Differences of opinion were noted under this heading. One user reported that the standard porcelain lining wore at a greater rate and was replaced with high density lining.

   All others reported an increase in lining life with standard porcelain lining. One user reported an increase in life of greater than 200%. In general it can be reported that life of lining is increased and that the wear is more uniform and not grooved.

In connection with items 2 and 3 above, it was generally reported that inspection of both ball and lining wear need not be done as often as in the case when porcelain balls were used. It was customary at Frigidaire to inspect the mill every 10 millings and to dump and sort balls approximately every 125 millings. With high density balls, we still visual check wear every 10 millings, but dumping and sorting is done only at re-lining time.

4. *Power Requirements*

   A mill manufacturer recommends the following power requirements:

Mill Size	*H.P.*
4 x 5	10
5 x 4	15
6 x 5	25
6 x 8	40
8 x 6	60

In closing, it can be stated that, although we do not agree on our milling practices as shown on the chart, the use of high density balls offers many advantages over porcelain balls. These advantages are greater capacity per mill, lower cost on ball and lining per pound of frit and less labor cost per pound of milled frit.

Adapted from a presentation before the 15th annual PEI forum for plant men.

"YOUR NICE BOSS SAID TO TAKE YOUR TIME GETTING WELL, THAT PRODUCTION HAS GONE UP 50%!"

"I CAN'T IMAGINE WHAT HAPPENED TO BILL, I WAS JUST GOING TO ASK HIM TO PUT IN SOME OVERTIME."

We Don't Want You to Take Your Worries With You *But* . . .

if you should happen to start thinking about the high reject problem in your porcelain enameling department, between fish, it might pay off to let these facts roll around in your thinking.

ING-RICH FRITS HAVE REDUCED REJECTS FOR OUR CUSTOMERS AND FOR US

Old man practical experience is the answer. Remember, we not only produce Frit . . . but . . . we have had more than a half century of experience in production enameling in our own large job enameling plant and in the enameling of our own products.

Laboratory research and test . . . naturally . . . but, also, day in and day out use of our own frits in our own production enameling plants. This combination has given us the "Know how" that will reduce rejects for you.

There's no obligation attached to a request for the visit of one of our plant tested service engineers, all we ask is a chance to prove our case.

ING-RICH
FRIT
"The Plant Tested Frit"

INGRAM-RICHARDSON, INC. OFFICES, LABORATORY & PLANT • FRANKFORT, INDIANA

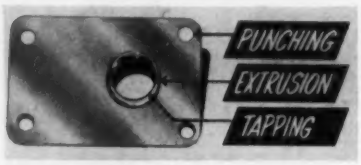
New Supplies and Equipment

More Information

For more information on new supplies, equipment and literature reviewed here, fill out the order form, or write to us on your company stationery.

H-10. All-purpose coolant for stamping, deep drawing, tapping

New A new water-soluble all-purpose cutting coolant can be used interchangeably for stamping, punching, deep drawing, tapping



and lathe work operations. It can be used full strength, or can be diluted effectively with up to 13 parts of water.

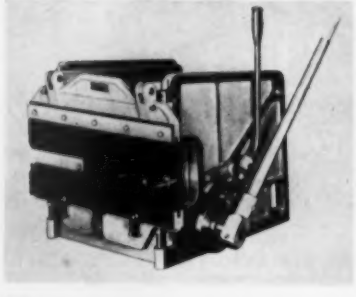
Photo shows micro-smooth finish on a motor bracket resulting from the use of the new lubricant in punching, extrusion and tapping operations.

H-11. New titanium flake frit "for exacting color requirements"

New A new titanium frit for porcelain enamel has been developed specifically to meet the needs of the appliance industry in the manufacture of colored home appliances. The high stability of the new flake frit is said to result in strong resistance to fading or to color variance. It has the proper coefficient of thermal expansion required in such applications as ranges, laundry equipment, refrigerators, and other appliances.

H-12. Hand-operated press brake rated at eight-ton capacity

New A new 24-inch hand-operated press brake, rated at eight-ton capacity, incorporates a special cam lever mechanism which provides ample power for forming, blanking, piercing, drawing, and trimming operations, plus a ratchet drive system that multiplies the power for heavy forming jobs. It is available with a complete line of both standard and special dies which are interchangeable with other press brakes.



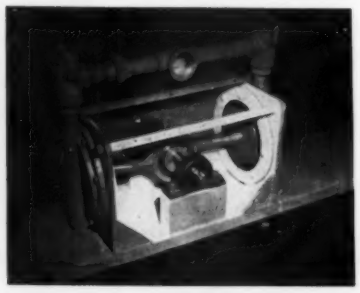
H-13. Thickness gauge for protective and decorative coatings

New This pocket size thickness gauge measures non-magnetic protective and decorative coatings on ferrous metal bases with an

accuracy of ± 5% ± .0001 inch. The six-ounce Elcometer can measure such films as porcelain enamel, plating, paint, foil, plastic sheeting, leather, glass, paper, rubber, lacquer, tinning, etc.

H-14. Pump for heavy and viscous liquids has 28 gallon capacity

New This 28 gpm Vitra-Pump is designed for pumping heavy and viscous liquids with maintenance-free performance. It is 4′ x 1′3″ x 2′7″ high, and weighs 475 lbs. It has already found a number of applications in enamel plants.



H-15. Pre-phosphating metal cleaner contains no metal activator

New A new type of pre-phosphating metal cleaner, which is relatively neutral and contains no metallic activator, is designed for use in mechanical spray processing equipment where a fine-grained phosphate crystal is required.

H-16. Special name plate decal for rigid specifications

New The attractive name plate for this cannister-type vacuum cleaner was developed to secure permanently to the curved ripple-

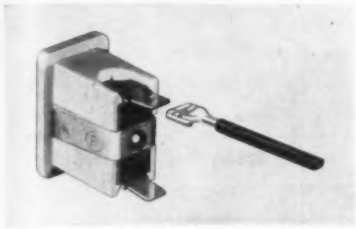
finish housing, and also to withstand rough treatment and motor warmth. The entire name plate decal can be installed in a single swift movement.

H-17. Amorphous phosphate coating

New "Ty-Bond" is said to be one of the first new zinc phosphate coatings to be introduced in many years because it is amorphous, instead of crystalline. Adherent and durable, the coating cannot be removed, cracked, or damaged by severe bending or flexing.

H-18. New appliance snap-in line

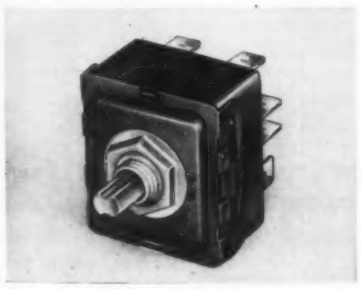
New A new snap-in line will fit any material from .025 to .095 thickness. Items in the new snap-in line are the appliance switch



which can be had with "on-off" reading for horizontal mounting; standard convenience outlet, and a "timed" or "auto" convenience outlet with horizontal or vertical reading; pilot light with standard locked-in red lens (or a clear or green lens); and the male load plug.

H-19. Rotary switches for heaters, room coolers, fans, appliances

New A new series of rotary switches are designed for use in air conditioning equipment, fans, unit heaters, appliances, etc.



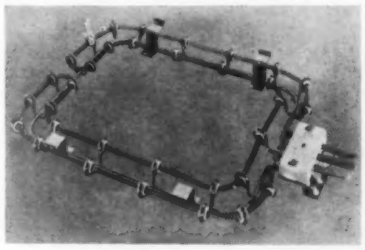
They have optional extension of the spindle through the back of the base to permit operation of dampers or gears and the ganging of electrical controls.

H-20. Free samples of new burners for gas appliances

New Samples of a line of new "Fisher Process" burners are available to gas appliance manufacturers requesting them on company stationery. Made of stainless steel, and featuring porcelain enamel bodies and venturi tubes, the burners can be used in gas ranges, space heaters, clothes dryers, and water heaters.

H-21. Perimeter oven heating element

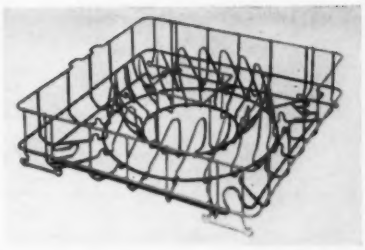
New Embodying high grade stratite insulators and nickel-chrome alloy helical coil, this new "Perimeter" oven unit is of "saddle



loop" construction, with floating terminal principle for easy mounting and removal. It provides fast recovery of temperature drop and improved heat distribution.

H-22. Custom-made wire components for dishwashers, freezers, refrigerators, fans

New Custom-made wire products are available in finishes and specifications including zinc plate,



organic and polyvinyl finishes. Applications are for dishwasher racks, refrigerator grids and shelves, freezer baskets, fan guards, etc.

H-24. Automatic time control for individual top burners and ovens

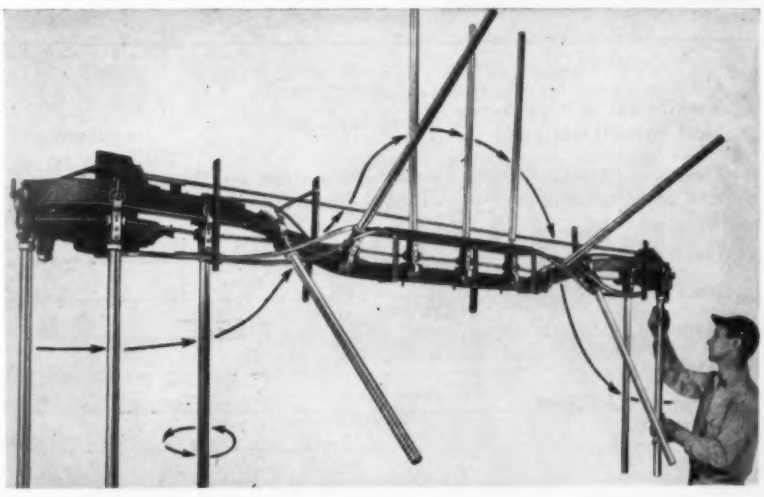
New An automatic "Potwatcher" time control for top burners and a "Temp 'n Time" control for gas ovens have been developed.

H-25. Ten-to-one efficiency for new-type industrial spray washer

New A new spray washer, just introduced, is reported to increase the effective washing action of the spray nozzles by ten times that of conventional washers. Low original equipment cost and low operating cost are described in case histories.

H-23. Conveyor provides even distribution of dipped finishes

New A new "Dip Aid" unit is available for use with a cable-type conveyor system handling parts through dipping operations. By imparting a variety of motions to the parts, it aids in securing more even distribution of finish. In application, the product emerging from the dip tank is swung counter-clockwise through an 180° arc, and then re-



turned to its normal position by the spiral twists in the rail. At the same time, a horizontally-mounted wheel engages a side rail to make the part or product rotate along its own axle.

New Industrial Literature

801. Operating cost figures on automatic spray washers

New An eight-page brochure includes operating cost data, cost comparisons between different types of spray washers, plus case history information on operating costs.

802. "Spray Gun Motion study"

New High quality spray finishes at a minimum cost with less fatigue is the theme of a new "Spray Gun Motion Study" booklet which describes the correct procedure in spraying various surfaces encountered in production spraying operations.

803. Rigidized metals selector

New A turn of the wheel of this new pattern selector gives complete specification data on any one of 26 Rigid-Tex metal patterns, showing an actual photo of each textured pattern.

On the back are suggested uses for rigidized metals, including appliance, automotive, aircraft, etc. Rigid-Tex metals are available in ferrous, nonferrous solid or perforated coils, or cut lengths.

804. "Trims, Panels and Escutcheons"

New This brochure shows examples of modern planning that reduces original tool costs by using stock dies in many cases for decorated metal stampings as functional component parts for home appliances.

805. Handy sheet weight calculator

New With a handy new sheet weight calculator, weights can be quickly determined for many types of special and commodity steel sheets, including coated and uncoated grades, as well as stainless steel sheets and plates, and the commonly used non-ferrous metals.

806. Spray finishing catalog

New Some 1100 products and accessories for spray finishing are classified into 11 sections for fast reference in this 74-page catalog.

Sections are shown on the front and back covers, and are keyed with the pages by a special thumb index.

807. "Industry's Medals of Honor"

New A new 16-page booklet, entitled "Industry's Medals of Honor", describes methods of setting up a service award program, choosing the design, and a wide variety of presentation methods. It also gives tips on methods of gaining publicity of the award presentation.

808. "Answers to Red Hot Problems" with ceramic coatings

New A technical brochure, entitled "Answers to Red Hot Problems", is filled with data, easy-to-read charts and photographs, and answers to questions about ceramic coatings for high temperature use. A unique feature of brochure is an actual sample of stainless steel foil .001 inch thick, which has been ceramic coated.

FINISH
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Elmhurst, Illinois

Please forward to me at once information on the new supplies and equipment and new industrial literature as enumerated below:

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No._____ No._____ No._____ No._____

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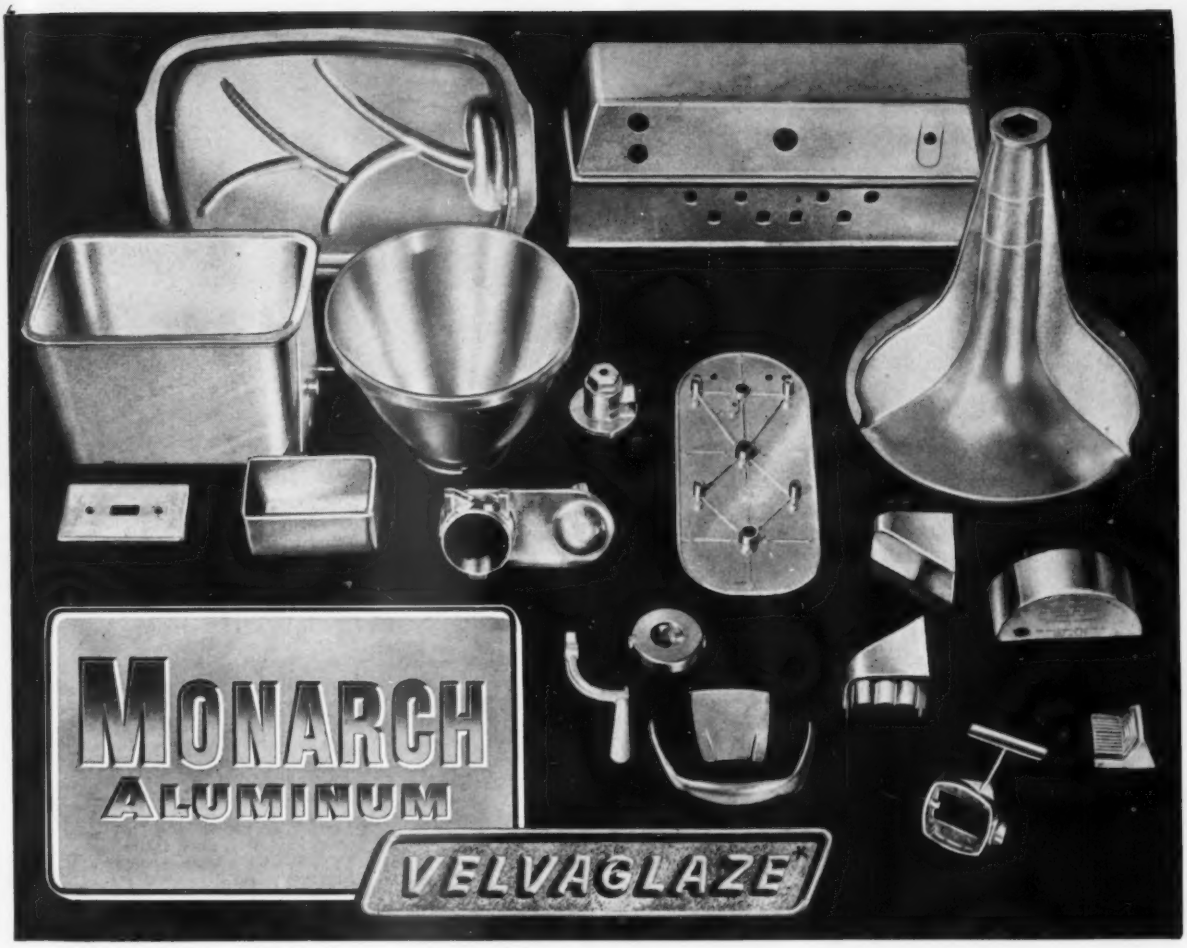

A SALES STIMULATING FINISH—

*with COST SAVING Advantages of UPF**

■ Imagine the practically unlimited opportunity to add unusual sales appeal and customer acceptance to your products with Velvaglaze.

We would like to show you in terms of the factual end costs of your products how Monarch's *Unified Production Formula eliminates hidden "extra" costs. We assume the undivided responsibility on many finished casting components to make such end results possible. Monarch's practical approach to all types of casting finishing methods has gained increasing acceptance by leading manufacturers in many industries, because Monarch's UPF* can accomplish factual *end cost* savings.

The parts illustrated are a few of the many current applications of VELVAGLAZE. Have a Monarch representative analyze your casting requirements today!

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Monarch also produces quality Zinc Die Castings, with any finish under the certified zinc alloy plan.

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ALUMINUM Permanent Mold Castings • ZINC Die Castings • ALUMINUM Die Castings • MACHINING • FINISHING • ASSEMBLY

Looking over Hotpoint's new Tusque-colored range are Marshall Dawson, Peoria dealer, and Paul George, Chicago zone manager. The color is a pastel fusion of blue-grey with a green overtone. It is said to automatically color-lock into an eye-pleasing blend with both white and colored kitchen equipment.

E. L. Farquharson, eastern regional sales manager, shows James' new portable disposer to T. M. Hamilton, western regional sales manager, and A. F. Williams, Oklahoma City dealer. The new appliance directs food waste into the sink drain just like installed disposers do. It is said to use less current than an electric clock.

Color emphasized at summer market

fewer units in home appliance lines urged by Sayre, Norge's new president

COLOR was the big item at the summer market held in Chicago. A number of manufacturers at both The Merchandise Mart and the American Furniture Mart displayed ranges and laundry equipment with colored exteriors, while most of the leading refrigerator producers displayed at least one model with colored interiors. Much colored trim for all types of appliances was in evidence.

Among the companies showing appliances with colored exteriors, or partial colored exteriors, were the following: Auto Stove, Duchess, Woman's Friend, Frigidaire, Universal, Gray & Dudley, Tennessee Stove, Kelvinator, Conlon-Moore, Pennsylvania Range & Boiler, Detroit-Michigan, Roper, Dortch, Hotpoint, and Magic Chef.

Holly Andrews was on hand at Pennsylvania Range & Boiler's enlarged space at the American Furniture Mart to demonstrate their new Douglas gas clothes dryer.

finishfotos

Short line called a boon to retail salesmen

At a press conference at The Merchandise Mart, Judson Sayre, recently elected president of the Norge Division of Borg-Warner, stated that manufacturers can cover the field with substantially fewer appliance models than in their present lines.

Sayre stated that a short line enables retail salesmen to become thoroughly familiar with it and to know how to sell it. He pointed out that last January Norge reduced its refrigerator line to four models, and as a result dealers have been able to

Larry Grant, sales manager, and E. N. Stiglitz, president, are shown with the new Stiglitz built-in range. The company also displayed built-in surface units, as well as "stack-on" ovens which are suitable for installation in steel kitchen cabinets. Oven doors are furnished in a variety of colors and finishes.

Republic Steel, which entered the steel kitchen cabinet field less than two years ago, introduced wood-grain finished units at The Merchandise Mart. James D. Hesser explains features of the steel cabinet line to Mary Davis Gillies and Sally Robb, both of McCall's Magazine editorial staff.

keep inventories under control, solve display problems, and boost turnover.

Discount houses — and trade-ins

Regarding discount houses, "they are a menace," stated Sayre. "When I say menace, I mean constructively they are something to put up with. Frankly, I think they keep a lot of people on their toes."

Trade-ins go along with the discount deal, he added. "I think one of the most effective things in all the appliance industry is the trade-in factor. I think this is where the legitimate dealer can effectively counteract the discount house", asserted Sayre.

Need to develop a market for rebuilt appliances

Retail dealers in general have never developed a market for rebuilt refrigerators, said Sayre, who pointed to the excellent job done by the automobile industry. He emphasized the fact that any trade-ins that are handled right can be profitable, because while there is a terrific saturation in refrigerators, there are still about 5,000,000 homes in this country that do not have electric refrigerators. "Then there is the recreation room; there is the two-refrigerator home; there is the children's room," Sayre pointed out as added potential markets for refrigerators.

During 1953 dealer failures appeared to be a problem. Actually, it was more statistical than real, said Sayre, pointing out that those who went out of business didn't have adequate training or financing.

Sayre concluded that it is up to the manufacturers to see that his dealers have adequate sales training programs for retail salesmen. "If we go after selling, and if we train our people, we are going to come out and do business."

Queen Stove Works introduced the Superbar as "America's newest appliance." Suitable for the office, club, or rumpus room at home, the Superbar is a combination dehumidifier, beverage cooler, ice cube maker, and liquor storage cabinet.

Crown Stove reported favorable reaction from dealers for its gas range with a knotty pine finish. Admiring the new range are Pete Jackson, Chicago sales representative, and J. C. Rogers, vice president and sales manager.

make your DOLLAR

Each year more and more porcelain enameling plants are learning how to make their dollar stretch when it comes to buying frit.

You stretch one way by saving on the original purchase price and you stretch another through more efficient plant operation.

You too can make these savings with Century *time proved* frits, frits that are tops for adding beauty and durability to your finished metal product.

If you haven't tried Century frit give us a ring right now — and stretch that dollar now!

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FRIT MASTERS

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What's the secret of durable, beautiful, long-wearing porcelain enamel finish?
An enameling base* sheet that offers maximum adhesion to the enameling frit, and forms a permanent, tight bond with the enamel finish.
PORCELAIN ENAMEL ON
USS Vitrenamel*
BASE
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TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK
UNITED STATES STEEL

FOR BETTER

"Paint Adhesion"

use

MACCO MACHINE CLEANER NO. 71

a phosphate cleaner and rust inhibitor

Illustration shows two sheets of steel, painted at the same time with the same paint and exposed for months to all kinds of weather. On the left is shown a surface which was cleaned and phosphatized with Macco M.C. No. 71. Note how clear and smooth it appears. On the right, a surface on which ordinary cleaner was used. Note peeling and rust blisters.

A MACCO CASE HISTORY*

As in all fields today, purchasers of metal products are constantly demanding more and more in the quality of their paint finishes.

By far the most efficient and economical method of preparing metals for the finest and most enduring paint job is by use of Macco M.C. No. 71. Laboratory and shop tests prove that, on steel, cast iron, aluminum or die cast, Macco M.C. No. 71 provides a corrosion-resistant phosphate coating comparable in quality to that formerly available only through expensive and elaborate methods of preparation.

TESTED ADVANTAGES OF MACCO M.C. No. 71 CLEANER

1. Cleans oil, grease, etc. from metals.
2. Etches metal to give better bond for paint.
3. Gives microscopic phosphate coating, greatly aiding in paint adhesion and corrosion resistance.
4. No special equipment required.
5. Never hardens in the drum.
6. Gives excellent protection against rust prior to painting.
7. Assures best possible protection to painted surface.
8. Can be run in conventional one, two, or three stage washers, as well as in other types.

Use Macco M.C. No. 71 Cleaner and Phosphate Coating and add immeasurable quality to the finish of your product.

* Actual case history, names, etc. can be had by writing today to

MACCO PRODUCTS COMPANY 9210 SOUTH SANGAMON STREET • CHICAGO 20, ILLINOIS

Recent trends in coatings formulation

a three-part article on progress of the past two years with respect to new directions of synthetic resin formulation emphasized in earlier progress report*

PART I

by William von Fischer • HEAD, DEPARTMENT OF CHEMISTRY AND CHEMICAL ENGINEERING

and Edward G. Bobalek • ASSOCIATE PROFESSOR OF CHEMISTRY, CASE INSTITUTE OF TECHNOLOGY, CLEVELAND, OHIO

IN contrast with the post-war period of 1945-51, a progress report on formulations trends for the past several years may seem relatively insignificant — if one looks only at the record of new raw materials and new techniques of formulation. In fact, very few new raw materials or coating types have captured the attention of paint designers since about 1950. The listings of significant new resins and pigments today is still much the same as three years ago (Table 1).

However, progress in paint formulation is not measured entirely by accumulation of new raw materials and in exploring future potentials of these raw materials. In all but exceptional circumstances, a new raw material or new paint application technique requires a number of years to prove its worth in actual industrial practice — even after the development has been enthusiastically accepted by its laboratory originators.

The complexities of production lines in paint represent numerous problems, each of which has to be solved individually before technical and economic advantages of new coatings can be realized in commercial practice. In the course of these efforts, many limitations, originally unanticipated, are found which throw the whole problem back to the fundamental research laboratory. Also, new engineering developments in the production of materials to be finished make obsolete the old problems for which new coatings were developed, and new problems are introduced which were not anticipated by the coatings formulator.

The design or formulation of coatings is now very much a part of, and a complement to, other engineering arts, and in measuring its progress it cannot be considered apart from these. This is a point which we emphasized in our earlier progress reports*, and we want to further emphasize this point even more strongly in this current report.

Rate of progress—old and new

Many of the old-timers in paint shops have lamented today's time lag between new developments on paper and improvements on the paint line. "In the old days," they claim, "production use would beat the headlines by several weeks." This is certainly true. However, the changes which were then thought of as "big" would be trivial by present standards. Also, in the past decade the paint formulator has had a somewhat different role than in years past.

Old art vs. modern science

Not too many years ago relatively few raw materials were available, and these materials were "raw" in the strictest sense of the term — such as oils, varnish resins, simple pigments, a few thinners, etc. The formulator's skill required that he know and understand *very thoroughly* the properties of these raw materials. He was charged with a great number of operations in converting these raw materials into more finished intermediates, and then into useful paints.

The net result was that the formulator, who was charged with adapting a paint to production, also had a far

Table 1*

Chronological Listing of Earliest Experimental Use of Synthetic Resins (Plastics) in Coatings

1910-19	Phenolic Resins
1920-25	Alkyd Resins (Oil-Modified)
	Cellulose Nitrate and Acetate
1925-31	Vinyl Polmers (Chloride-Acetate)
	Acrylate Resins
	Cellulose Aceto-Butyrate
	Urea Resins
1932-37	Ethyl Cellulose
	Polystyrene
	Synthetic Rubber
	Vinyl Acetals
1938-43	Vinyl Resins (Acrylonitrile-VinylidineChloride)
	Nylon and Polyurethane Resins
	Melamine Resins
	Allyl and Unsaturated Polyester Resins
	Cyclohexanone Resins
1943-51	Epoxy Resins
	Polyethylene
	Poly Fluoro (or Fluoro-Chloro) Ethylene
	Silicones

*Reprinted from May 1952 *finish*.

*"Synthetic Resins for Industrial Finishes," May, June and July, 1952, *finish*.

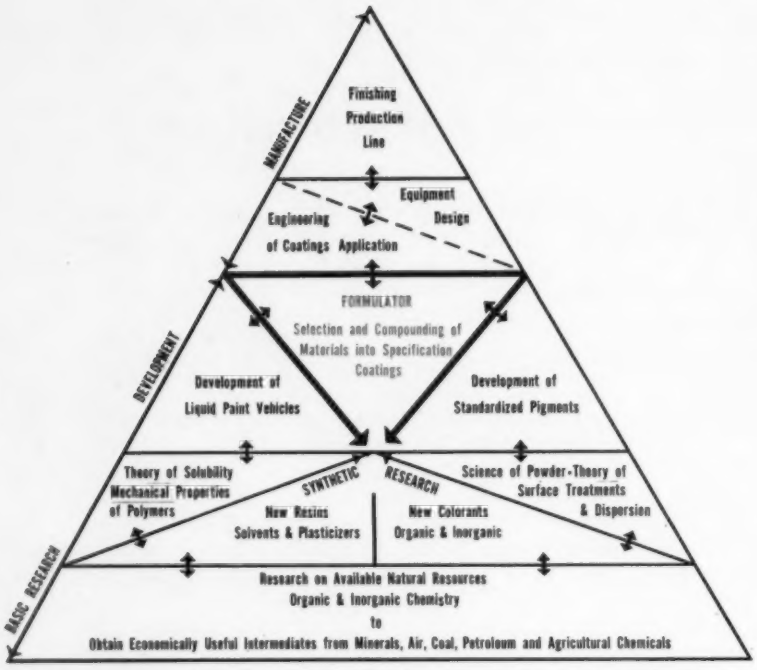


Figure 1 — A schematic diagram showing the position of the modern formulator in the research and development program leading to the end result of a new finish on the production line. The cooperative fields are in contact in proportion as their boundary areas are adjacent in this diagram. The modern formulator is a practical coordinator of the work of numerous other specialists, and his control of the whole process is limited by his necessary dependence on some specialists and his limited contact with others. By contrast, the formulator of 30 years ago, working with a few naturally occurring raw materials, used his art to control the whole process of design, manufacture and application of coatings. Primarily, the possibilities of better coatings are limited only by the commercial availability of chemical resources at the very foundation of the diagram. The scheme will lead to new coatings only if economics are favorable in all phases of the program.

greater responsibility and far greater control over all details of paint making—even though he had fewer starting materials with which to work. The raw material suppliers followed the policy of giving materials the minimum of processing, and providing the paint formulator with the maximum of research data to guide his responsibility in the proper manipulation of these materials. Because of the great variety of viewpoints and procedures used, a number of coatings made from the original raw materials were quite variable in properties.

The biggest change of the past few years is that the raw materials for paint are increasingly less "raw". The formulator more frequently does not begin with the vehicle constituents, as he did in the varnish era, but rather he is given finished resin solutions, or emulsions, or plastics, in which the property variability is controlled and known to the resin chemist, but not necessarily to the paint formulator.

The paint formulator no longer designs and tailors vehicles as much as he selects from the industrial catalogs some semi-finished product having pre-determined properties. The variety from which the selection can be made is greater, but the amount of control over details and modifications is smaller.

Except in color matching, in which the formulator still carries a heavy burden, even control over pigmentation is less. Many pigments are now pre-treated in manufacture by techniques which are unknown to the formulator. This is done to give definite results if the pigments are processed in a particular way. Again, the number of selections is greater in terms of semi-finished products, but the amount of control over details is a great deal less.

Most research on the semi-finished materials by raw material suppliers is incorporated directly into the products, and considerably less is given to the paint compounder to guide him in making variations. Even if he wants to make variations other than in selection of standard semi-finished items, he cannot get the materials sufficiently "raw" or secure sufficient information about his materials to allow him to modify these. In effect, the final stage of formulation has become more of a selection and mixing operation, while in its fundamentals, the advances and changes in formulation are controlled by resin and pigment chemists who are only remotely connected with the "firing line" of adapting complete coatings to the production line.

This complexity of the division of responsibility is possibly one reason for the relatively slow rate of progress in converting an excellent laboratory invention into a production line reality. Potentially new developments in coatings pile up years ahead of the time of their actual use in large volume. Eventually, the formulator who is near the end point of coating design will be drawn closer to the chemical industry which supplies him, or vice versa. Until the evolution in either direction is complete, we will see new findings reported, in general, long before they become commercial in particular instances. Considering the fact that chemical companies have often shunned the practical end point of formulation while paint manufacturers have generally shunned chemical manufacture, it is a marvel of liaison that the gap between laboratory and shop is as short as it is.

Progress in new materials

Because relatively few new resin types for coatings have been developed in the past three years, we must not assume that the formulation art has been standing still. While no new synthetic resins have been proposed in terms of general definitions of resin classes, a great number of new sub-species or modifications have

been established which make for more effective coatings.

For example, many new resins can still be classified as aminoplasts, silicones, epoxy, or vinyl resins; however, these new resin modifications have solved certain critical formulation problems which limited the utility of their original form of 3 to 5 years ago. Many limitations have been overcome with respect to such critical problems as the difficulties or high costs of coatings application, and film deficiencies in adhesion or chemical resistance.

Finishes for non-metals

The increased use of a number of non-metallic materials by engineers for manufacturing such products as car bodies, TV cabinets, wall partitions, etc., has considerably de-emphasized the problem of corrosion protection, and greatly magnified the problems of low cost attainment of decorative coatings having considerable durability.

This implies that the *adhesion problem* is no longer thought of exclusively as the *adhesion problem to metals*. There are other important considerations both in terms of the nature of the surface preparation and in terms of entirely different physical characteristics which are required in films that are to be applied to materials which are less dimensionally and thermally stable than metal. In connection with this rapidly developing field of production coatings, the emulsion types of finishes will assume far greater importance than was dreamed of six years ago. This point deserves further amplification in later sections of this three-part review.

Use of insoluable resins in modern coatings

Five years ago, one of the big problems of paint formulation was how to use synthetic resins that were too insoluble to lend themselves to normal solvent-type lacquers.

The use of better solvents and "hot spray" techniques represented a partial solution of the problem for borderline cases. Where the insolubility was so extreme that there was no question of borderline situations, the techniques had to be something more revolutionary. In our earlier reviews, and also in our recent textbook*, we pointed out the potential promise of two techniques: (1) hot-melt application via flame spray, and (2) dispersion resins, as represented by latex, emulsions or organosols or insoluble resins in a volatile thinner. After two years time, it would be fitting to comment on the extent of progress in these directions.

Flame spray

Regarding flame spray, the reports on progress have been notably scarce. For most resins, with the possible exception of polyethylene, the problem of preparing suitable resin powders and blending such pigments and other essential additives has proved to be technically very difficult. For lack of a wider range of suitable plastics for this application method, the development of improved equipment has lagged. The development of equipment often seems to wait on suitable materials, and vice versa. At least there seems to be no widespread interest at this time in developing this formulation trend.

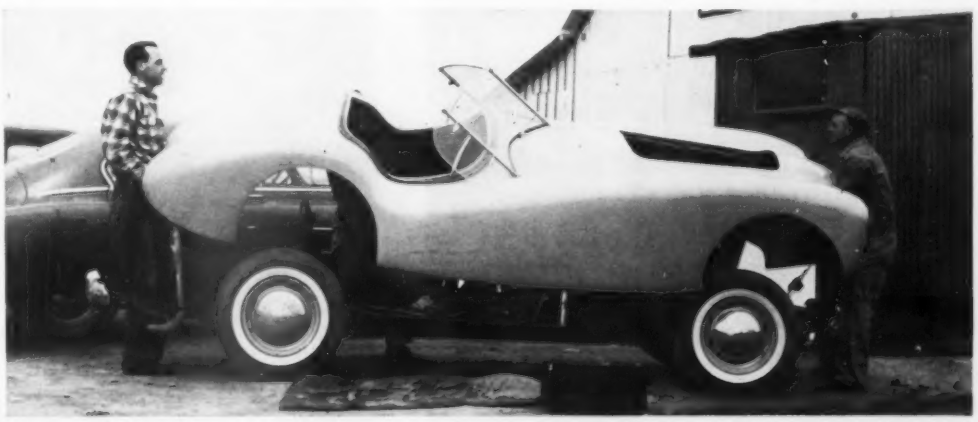
One of the more discouraging features of some of the earlier results with this method was that difficulties were encountered in laying down truly continuous films — that is, films that were free of flaws and porosity and which were of uniform thickness, and which had good adhesion, and homogeneous cohesion properties. To obtain even passable protective properties, very thick films were necessary, and extreme care was required to assure that the surface was thoroughly cleaned and properly roughened by sand blasting. If a subsequent bake was necessary to help fuse the film, many of the advantages of flame spraying were lost. Whatever may be the future promise of this technique, there seems to be no strong trend at this time to adapt it to mass production finishing lines, and it will have to establish itself slowly in a few specialized applications in the custom manufacture of specialized industrial equipment or in the electrical industry.

Importance of dispersion resins

Regarding dispersion resin techniques, the progress of the last few years has been great in both the plastics and in the coatings industry. This is particularly true of water dispersed latices or emulsions. About six years ago latex and emulsion paints first made their bid in competition with oil types in trade sales, architectural finishes. In this field

to Page 64 →

*"Organic Protective Coatings", Reinhold Publishing Corp., 1953.



2 — An experimental ass-polyester automo- dy. Structural materials ype are receiving wide nce by design engi- Market researchers esti- at 100 million pounds of polyester plastic will d in manufacture and ment programs by the 1956. Much research o be done to establish decorative finishes for new engineering materials.

HOTO COURTESY NAUGATUCK DIVISION, U.S. RUBBER CO.

Ferro Electric Products, Inc.

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EXHIBIT PHOTOS FRO 54

The Merchandise Mart

Typical booths
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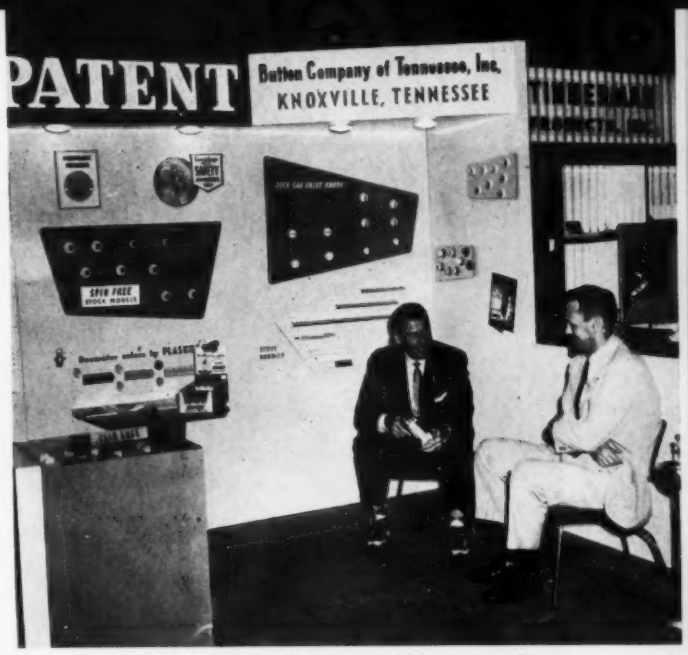

Patent Button Company of Tennessee, Inc.

54 STOVE MEETING

its at this year's
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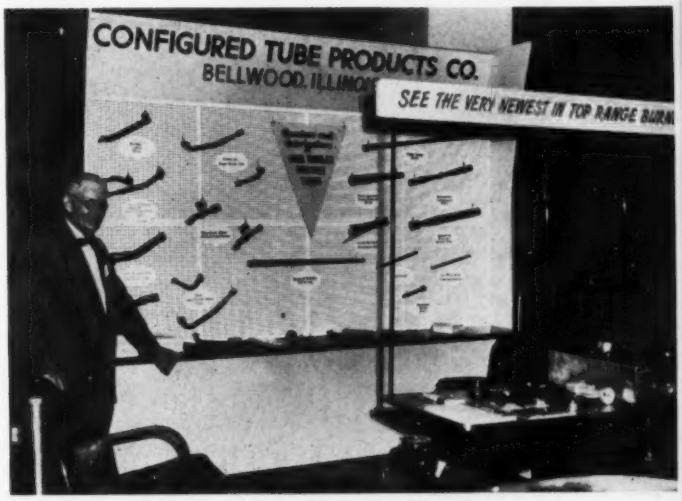

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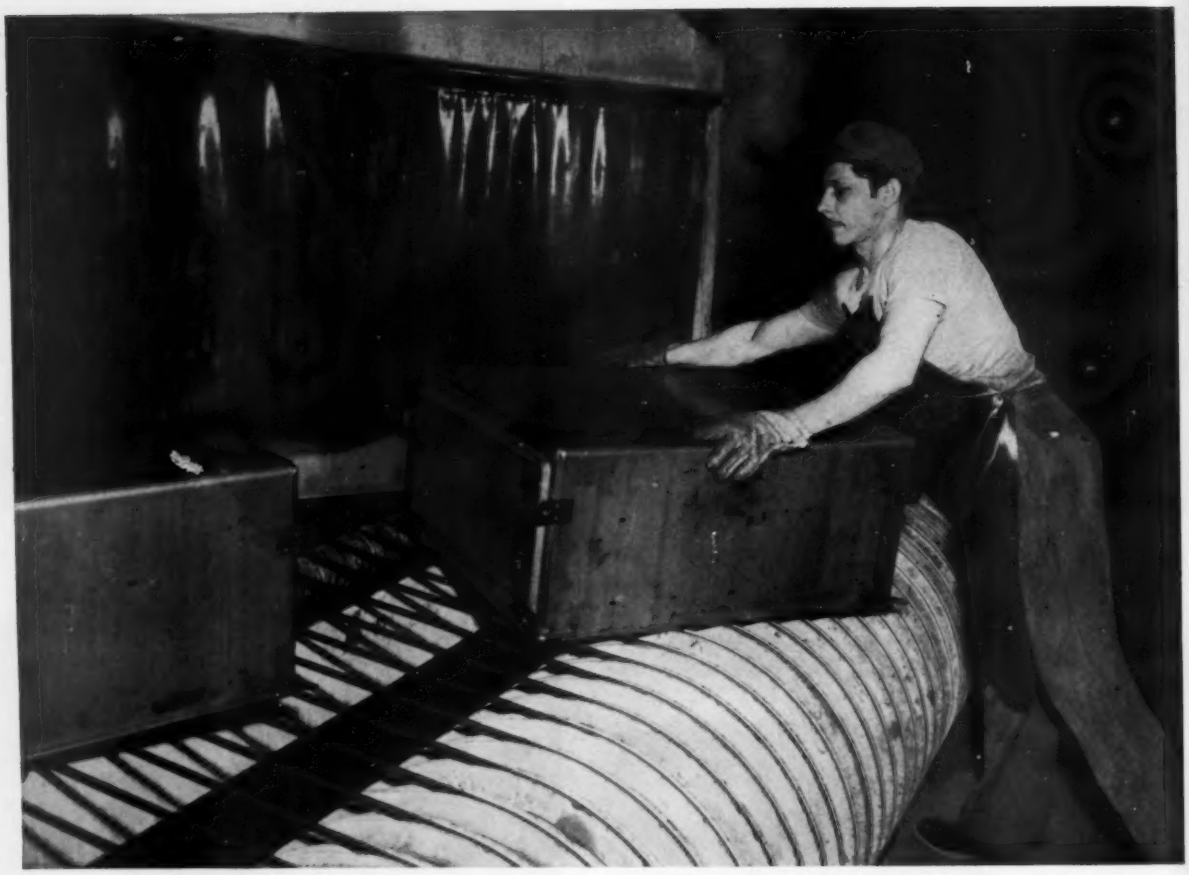
American Emblem Co., Inc.

Robertshaw-Fulton Controls Co.



Deep-drawn refrigerator liners entering spray machine at Hotpoint for pre-porcelain cleaning. Other than plant grime, soil present is a wet-type drawing lubricant, alkali resistant and difficult to remove. If not thoroughly removed, however, it causes defects in the porcelain coating.

Pennsalt Serviceman J. E. O'Brien checks liners and pans after cleaning with PENNSALT CLEANERS EC-54 and #30. All soils have been removed.

Porcelain-enameled parts in this Hotpoint refrigerator provide sales-building beauty and lifetime service thanks to reject-free Pennsalt cleaning.

CLEANING REJECTS VANISH WHEN HOTPOINT TEAMS UP PENNSALT CLEANERS

Normally, Hotpoint uses drawing lubricants that are easily removed. But the draw on these liners and vegetable pans was quite severe, requiring a hard-to-remove, alkali-resisting lubricating compound. Their usual cleaner did not remove all the soil. The residues interfered with coating quality.

Hotpoint called in the Pennsalt Field Service Representative. He recommended two cleaners; Pennsalt Cleaner EC-54 for the pre-cleaning spray, Pennsalt Cleaner #30 for the main spray. They efficiently and economically removed all soils, and defects vanished.

PENNSALT manufactures a complete line of fast-acting, low-cost metal cleaners for plating, porcelain enameling, painting and phosphatizing operations. Pennsalt Metal Processing Specialists will help you select and use those best suited for your plant needs.

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Pennsalt Chemicals

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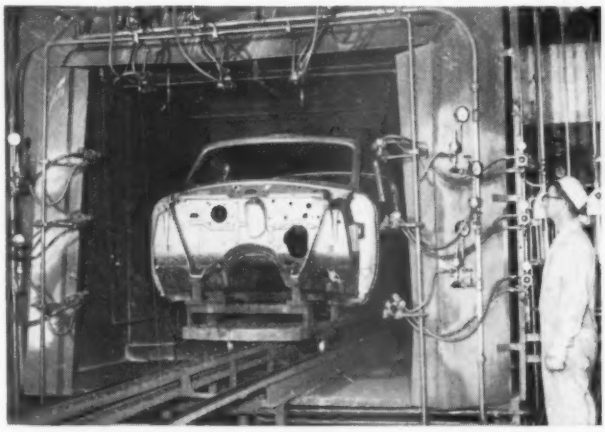

Automatic electrostatic spray enables Studebaker to apply a heavier and more uniform primer surfacer while giving them a net saving of 1.81 per body in paint and direct labor. Not only is the Ransburg method providing the desirable increase in uniform film thickness, but it is enabling Studebaker to paint more bodies per hour with the substantial savings in paint and labor over the former hand spray method.

The heavier, and enduring, first coat on Studebakers provides the necessary base for the superior finish . . . a finish which resists all kinds of exposure conditions, such as combinations of warm and humid climate, and prolonged bright sun exposure.

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Ransburg **ELECTRO-COATING CORP.**

Indianapolis 7, Indiana

RANSBURG

Recent trends in coatings formulation

(Continued from Page 59)

they have become well established, and formulation interest continues to be high in exploring the possibilities of new resins of the butadiene and vinyl polymer types. Most of these trade sales paints are designed for air drying. As such they find some use in industrial finishes, particularly in components for pre-fab housing, and other structural materials such as accoustical board and wall panels. Many of these emulsion coatings can be baked, and they lend themselves to fast production lines in the coating of composition board, rubber, plastics and a variety of other uses.

After using suitable lacquer-type undercoats, emulsion paint top coats can be used even for metal. As compared with standard solvent-type finishes, these emulsion paints still do not allow for a great variety of color formulation or for as much control of luster. Hence, they presently seem to have a place only where flat or semi-gloss finishes are required.

Dispersion resins in organic solvents have advanced considerably. At least four manufacturers of resins prepare resin powders that lend themselves to organosol or plastisol application. For coating of paper, cloth and some non-metals, the vinyl organosol is an established production procedure, and has long since ceased to be a development curiosity. A good deal of experimental information has been accumulated regarding ways of applying such finishes to metals, but up to the present time the technical difficulties and economics have not permitted the widescale production application of such finishes to metals.

Table 2

Some Two-Package Resin Systems which Might Be Adapted to Equipment that Mixes Components at Instant of Paint Application

Resins in Package A:	Package B, Solution of:
Epoxy resins (or their mixture with other resins)	Catalyst or Coupling agents
Styrene solution of polyesters	Activator or Accelerator
Allyl resins	Activator
Polyvinyl butyral + Chromate pigment	Phosphoric acid
Polyesters (or a wide variety of other resins)	Diisocyanates
Neoprene	Curing agents or Accelerators
Silicone resins	Catalysts
Alkyds, cellulose resins (or a wide variety of other resins)	Alkyl titanates
Fast-curing amino resins	Alkyd resin + accelerators
Some vinyl resins	Some phenolic resins
Phenolic resins	Accelerators
Vinyl organosols or Plastisols	Solution lacquers of resins that improve adhesion or gloss and/or plasticizers or solvents that lower fusion temperature
Emulsion or Latex of a variety of synthetic resin types or their mixtures	Water unstable pigments (e.g. aluminum powder) Other latex resins that are package unstable with reference resins; or electrolytes, solvents that promote better film coagulation

The acceptance of the resin dispersion versus resin solution concept, as exemplified obviously in the vinyl organosol technique, has had an indirect influence on many aspects of the general field of resin formulation. For example, it is a feature now actually sought for in the formulation of alkyd-type flat wall paints in trade sales formulation. It has been used in developing finishes with synthetic rubber-vinyl blends, and also in the manipulation of chlorinated rubber, certain phenolic resins, and alkyd-copolymer resins. A few years ago, much of the emphasis in lacquer formulation was in the direction of a search for ever stronger (and more expensive) true solvents and more soluble resins.

Now, we tend to lean toward thinners of increasingly poorer solvency, and resins of greater insolubility — nevertheless, we still have low viscosity, liquid paints, because the resins are kept in suspension in the form of small particles rather than in molecular solution. This simple principle of formulation has by-passed many difficulties which were regarded as almost insurmountable only a few years ago, and this approach will be expanded in time and will include many new resin systems. As will be pointed out later, the advantages of this technique hold even when working with resin mixtures. Formerly, we thought that this procedure was so complicated that it has to be confined to simple, one-component resin systems. Now we have reason to believe that *this approach actually creates more versatility in blending mixed resins than is feasible with soluble resins.*

Limited stability paint systems

Unfortunately, it is still true that many of our improved synthetic resin finishes tend to be unstable in storage, particularly if a catalyst has to be added to cure the film, or if plasticizers or other components are required just before use. This problem

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has been dramatized mostly for the epichlorohydrin resins and polyester finishes. Some effort has been made to seek a remedy in application equipment design, such as spray guns which draw from two containers and actually mix the components during application. The original efforts to use this procedure in production have had only limited success. The major problem has been in obtaining adequate and uniform mixing. Uniform mixing would hold viscosity constant throughout application and would provide a final film which is truly uniform and homogeneous. Either the equipment development or the formulation of paints, or both, are not yet adequate to provide a completely satisfactory procedure. Very few such systems are yet sufficiently foolproof to allow their large volume use under moderate supervision on production lines. Nevertheless, the direction of our coatings formulation is such that this problem will have to be solved.

Batchwise mixing of paint just before use, and the rapid disposal of materials of limited pot-life, create production problems that are an intolerable nuisance. The original imperfections of the dual spray gun technique will not stop efforts to solve the problem according to this principle. Controlled automatic metering of the mixing operation by some procedure is definitely an objective that demands and is getting more attention. Considering the simplicity of the original experimental approach to this problem, it is surprising that the early results were as favorable as they proved to be. This fact should encourage further experimentation in these directions actually to a greater extent than the recognition of the early imperfections should tend to discourage it.

Emphasis on film thickness

For most of the history of paint on either metals or non-metals, it has been customary to think of paint films as being at most something on the order of 5 mils thick. Modern demands for both decorative and protective properties have rapidly been making this conception obsolete. The first action following recognition of fact was provided by plastics engineers who developed techniques for adhering sheets of plastic of film thickness up to 1/4 inch onto metals.

Development of better plastics and adhesives, and especially of the new techniques of wrap-around plastic tapes, has made these techniques more useful by far than they were five years ago. However, for many manufactured articles, the shape and size does not lend itself well to application of sheet plastic. In these cases, an application of paint is the only solution. With traditional paints, this means anything from 5 to 15 coats in order that an adequate film thickness is obtained. The remedy for this difficulty is very old — namely, the use of high-solids-content paints of heavy consistency — that is *mastics*.

Bituminous and oil-base mastics of this kind have been used for maintenance of industrial structures for years. Only in recent years, however, has this principle been utilized effectively for coatings based on modern synthetic resins. In these recent years, great progress has been made in producing a variety of *synthetic resin mastics* which have properties competitive with adherent, prefabricated sheet liners. This direction of paint formulation has been encouraged because it gives films that are more protective against corrosion. These can also be used to develop a new type of protection that is increasingly receiving more emphasis, namely, *flame retardance*, or *heat insulation* for either metallic or non-metallic structures. Current formulation research is attempting to improve the decorative value of these protective mastics.

Progress in color control

The advances in color formuation have been less obvious, but nevertheless real. As is almost inevitable, a few new pigment colors have been added, the significance of which is apparent to color formulators, but hardly of much concern to the users of finishes. From the viewpoint of those who are required to purchase and use paint, the most significant fact is that many of the brighter and more novel organic pigments have been improved in their properties so as to make possible paints that are less of a color problem in spray, dip, or roller-coated finishes. This is particularly true of the green and blue color tints but it is apparent also to a lesser extent with many other colors. Improved metallic pigments have simplified some of the problems of formulating more uniform metallized colors and also the hammertone novelty effects. At the present time, however, these metallized decorative finishes have suffered some eclipse of popularity in favor of the pastel colors or light tints of clean organic pigments.

Summary

In a general summary, regarding trends already mentioned, we can list the advances of the past three years according to the following titles:

1. Improvements of synthetic resins to allow for more useful coatings.
2. Greater emphasis on finishes for non-metals, resulting in the greater importance of dispersion resins, organosols and emulsion coatings.
3. The growing importance of anti-corrosive and flame-retardant mastic coatings.

Each of the above points will be expanded in detail in the remainder of this progress report.

The steel mill goes modern

→ *from Page 37*

lines, each 381 feet long with speed of 800 feet per minute. The lines are used to cut coils into sheet lengths up to 180 inches long.

The coil stock is side trimmed, goes through a roller leveller and then sheared automatically to length. The sheet then goes through another roller leveller and continues on to an automatic stamper where the Youngstown trade mark and lot number is stamped on. The sheet then reaches an inspection station where the inspector pushes a button which operates a flipper gate to segregate the rejects, the good sheets going on to the automatic piler where they are picked up with a tractor-carrier or crane and taken to shipping building.

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is a product which provides an even crystalline coat of fine phosphate particles chemically bonded to the surface of the steel. This in turn serves as a matrix for the paint, which, when baked on, has adhesion properties second to none.

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has proved highly successful for cleaning steel during pickling for Porcelain Enameling. NAMEL-CLEEN possesses outstanding emulsification properties and characteristics that assure long life in use . . . a unique balance seldom found in a proprietary product.

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will provide economical operation and improved production, due to higher cleaning efficiency and longer life. POWER-CLEEN has been used successfully in porcelain enameling, painting and cleaning prior to electroplating, and has many general purpose applications where barrel cleaning and continuous cleaning units are utilized. POWER-CLEEN will remove oils, drawing compounds and greases quickly, economically, and efficiently. Give yourself the best finish possible. Use POWER-CLEEN to obtain it.

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is a caustic based aluminum etching compound specially formulated to eliminate scaling in the etch tank and to minimize or eliminate sludge formation. It is a free flowing, anhydrous flaked material that possesses outstanding non-sludging properties. ESSAK ETCH conceals die marks and surface flaws and produces the satiny etch which is desirable to give a smooth appearing surface.

ESSAK *SPRA-CLEEN*

is a well balanced, potent, spray cleaner which provides complete solubility, long life and unexcelled results. SPRA-CLEEN has been used successfully in railroad cleaning, stamping plants, food processing plants, etc. This experience assures you of complete positive performance and an end product of finest quality.

ESSAK *LECTRO-CLEEN*

is a well balanced potent electro cleaner developed for use prior to electroplating. LECTRO-CLEEN has the necessary conductivity to reach corners and other hard to get to areas. It has been used successfully on small appliances such as toasters, irons, hardware, radio and T.V. components, and on metal furniture, etc.

ESSAK *STRIP-ALL*

is a heavy duty soak cleaner which has high solubility and long life. STRIP-ALL has been used successfully in paint stripping, and for removal of heavy greases and oils found in automobile and truck maintenance and railroad shops. STRIP-ALL will perform at its best under heavy and hard to remove soil conditions.

ESSAK *ALUM-CLEEN*

is an outstanding non-etching aluminum soak tank cleaner showing marked superiority in the removal of finger marks and shop soils. ESSAK-ALUM-CLEEN is an anhydrous powdered alkaline cleaner specially inhibited to eliminate attack on aluminum. This product is recommended as an all purpose non-etching detergent for cleaning aluminum sheet stock and may also serve as a mild general purpose metal cleaner.

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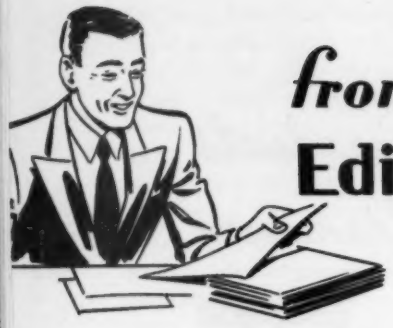

from the Editor's Mail

1944 10

We believe *finish* to be the most informative trade paper in the field it serves.

Thur Schmidt
President
Hart Metal Products Corp.

A fine magazine. It is well prepared and has very interesting articles.

L. P. Primosch
Chief Engineer
Bryant Heater Division
Affiliated Gas Equipment, Inc.

I appreciate the splendid work you have done during the past ten years and hope that you may continue to serve the appliance and metal products field for many more.

R. E. Hess
Engineer
Hotpoint company

I have been in this organization seven years and have found your magazine of tremendous value in our business. There are lots of ideas and short cuts to be gained from reading it.

William Chamberla
Manager
Hanson PorcEnamel, Inc.

I enjoy reading your publication very much. It is an excellent magazine.

W. W. Windahl
Purchasing Agent
Corry Jamestown Mfg. Corp.

I have always looked forward to the next issue of *finish*, and have read and used it from the first issue. A fine publication in every respect.

Ivan E. Oaks
Enamel Dept. Supt.
Florence Stove Company

I would like to take this opportunity to thank you for supplying this magazine to me over the years. I read every issue with great interest.

George I. Wiese
Division Superintendent
Landers, Frary & Clark

We have appreciated receiving your fine magazine during the years. It has been of a great deal of help to the students and faculty.

John W. Whittemore
Dean of Engineering
Virginia Polytechnic Institute

Your magazine *finish* is read each month by the persons shown on the face of this letter. It has proven to be a good source of information on new developments and procurement of the latest equipment.

J. F. Lewis
Superintendent
American Emblem Co., Inc.

Chicago Mill and Lumber Company congratulates Dana Chase Publications on the 10th anniversary of *finish*, the Magazine of Appliance and Metal Products Manufacturing.

We take pride in having been a charter member of the *finish* advertising family, and hope we have contributed in some small way to the remarkable growth of this leading trade publication.

Our mutual interest and contributions to Safe Transit have brought us closer together. On behalf of our industry, we express our gratitude to the staff of *finish* for their efforts and space devoted to the growth and success of this promotion of improved packaging and shipping.

We, too, are celebrating an anniversary — our 73rd Year of Progress . . . A pioneer in our field salutes another pioneer . . . A tribute to America and free enterprise.

F. W. Stuart
Chicago Mill and Lumber Company

ANNIVERSARY YEAR 1954

The present make-up of *finish* magazine is excellent for the appliance industry.

Harold O. Berry
Chief Engineer
Glenwood Range Co.

Always enjoy receiving *finish*—in fact I maintain a file if you have occasion to want back copies.

C. Roy Ohnimus
Sales Department
Western Holly Appliance Co.

I look forward to receiving your fine magazine each month.

Neil T. Reeves
General Manager
Western Stove Company

I enjoy *finish* magazine very much — it is the best of publication of its kind.

E. B. Flowers
Engineer
The Warren Company

It affords us great pleasure to extend to you our sincere congratulations on the 10th anniversary of *finish*. Its value to the metal products manufacturing industry over the years is attested by its solid growth through a most trying period of war and post-war adjustment, and we wish you many more years of progress.

E. L. Seasholtz
J. M. Seasholtz & Sons, Inc.

We enjoy receiving *finish* very much, and find it to be a great help to us in many instances on different articles or processes. Also, many of the articles on other plants have been interesting. Thanks very much for the past issues, and we look forward to the arrival of future issues.

H. M. Dowds
Supt. of Finishing
Mullins Manufacturing Corp.

I am proud and pleased to have witnessed the inception and steady growth of *finish*. It has developed into one of the few worthwhile trade magazines. Congratulations.

Martin Steffens
Ass't. to the President
Geuder, Paeschke & Frey Co.

I go through your magazine from cover to cover, and have learned many things from your articles.

R. S. Hemingway
Sales Department
RCA Victor Division
Radio Corp. of America

We have enjoyed your *finish* magazine greatly.

S. M. Singerfoos
Quality Control Manager
Bendix Home Appliances Div.
Avco Manufacturing Corp.

I read each issue of *finish*, and enjoy your fine magazine.

James H. Jacobi
Engineer
Appliance & Electronics Div.
Avco Manufacturing Corp.

I find that *finish* is a valuable addition to our knowledge of what is going on in the industry.

M. J. Asch
Foreman
Vendo Company

We have found your publication very useful. Have made purchases from advertisers in your book.

W. M. Gleicher
President
New York Soda Fountain Co.

These represent only a few of hundreds of comments from *finish* readers which we gratefully acknowledge. Others will be published as space permits.

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CERAMIC COLORS • CHEMICALS • SUPPLIES
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Since 1891
World's Most Complete Ceramic Supplier

West Coast Warehouse, Laboratory and Office, 4747 E. 49th Street, Los Angeles, California

Rolled right, tempered right . . . that's why Youngstown sheets form right

Battery of annealing furnaces (at right) in the new cold rolled sheet mill at East Chicago, Indiana.

"Proof of the pudding is in the eating"—and proof of the quality of cold rolled sheets is in the way they work up in your shop.

The parts or products you form from Youngstown sheets will be right—low in rejects, low in fabrication cost—because at Youngstown we stress quality above other considerations. Youngstown sheets start as top quality steel, are cold rolled to close specifications, annealed to exact requirements, tested and inspected at every step.

Phone our nearest District Sales Office for dependable cold rolled sheets and strip.

QUALITY V YOUNGSTOWN SERVICE

Youngstown

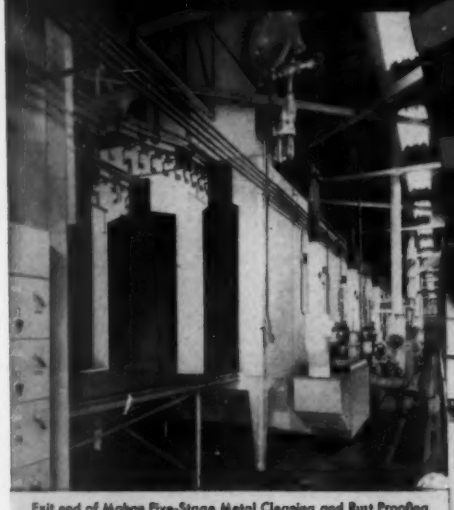
THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

COMPLETE *Finishing* SYSTEMS

. . . for ENAMELS • LACQUER • PAINT • VARNISH



Exit end of Mahon Five-Stage Metal Cleaning and Rust Proofing Machine. Note two parallel conveyor lines pass through this unit.

. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

Mahon Hydro-Filter Spray Booths with modern "HYDRAIRE" Flood Sheets are staggered right and left hand to permit spraying on opposite sides of parts without turning.

Mahon Dry-Off Oven and entrance end of Mahon Cooling Tunnel which reduces time-length between Oven and Spray Booths.

The Mahon Direct Gas-Fired Finish Baking Oven in this installation is located overhead to permit 100% use of floor space below.

More RESIDENTIAL HEATING UNITS Receive Their FINE FINISH in a COMPLETE MAHON FINISHING SYSTEM!

Here is another Complete Mahon Finishing System designed, built and installed to produce specific results on a particular product. The system is ultra-modern in every respect . . . it includes a two-conveyor line five-stage Metal Cleaning and Rust Proofing Machine, a Dry-Off Oven, a Cooling Tunnel, two Hydro-Filter Spray Booths, and an overhead Finish Baking Oven which permits use of the floor space below. Direct Gas-Fired Units provide the heat for both Dry-Off and Finish Baking Ovens. Temperature control is automatic throughout. If you have a finishing problem, or are contemplating new finishing equipment, you, like many other alert manufacturers, will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified to do the all-important planning, coordinating and engineering of equipment—which is the key to fine finishes at minimum cost. You will also find that Mahon equipment is built better for more economical operation over a longer period of time—this is an important factor which should be carefully considered when comparing initial cost figures. Mahon's thirty-two years of experience in this highly specialized field covers thousands of Complete Finishing Systems including Dip, Flow Coating, and Spray Equipment for every conceivable product painted on a production basis. See Sweet's Plant Engineering File for complete information, or write for Catalog A-654.

THE R. C. MAHON COMPANY

HOME OFFICE and PLANT, Detroit 34, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling, and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems and Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

Production of colors in titania opacified frits

(Continued from Page 43)

Because of the lower opacity, this type frit requires considerably less oxide for a color match than the more opaque frits. With the constant attention to reducing production costs, this will be a prime consideration in fitting any color into production.

The lower opacity creates a disadvantage in this frit. A first coat application of 30 gms/sq.ft. or 3½ to 4 mils fired thicknes is required to maintain a uniform color on reops should reoperation be necessary. The use of a mill added titanium opacifier will increase the reflectance in cases where somewhat brighter colors may be required. However, the use of such an opacifier will require slightly more oxide to maintain the strength of color required.

These semi-opaque frits have proven very successful for the medium strength and pastel colors. It should be pointed out that as brighter colors are developed, they are matched in the opaque frits rather than in the semi-opaque frits. These colors provide a more complete range of colors available to the appliance manufacturer. However, studies made with colors have shown that the pastel and "muddier" colors "wear" better psychologically on appliances. Although first impressions of the "muddier" colors are generally poor, an appliance finished in such a color is much more pleasing in appearance over a period of time.

3. *The titanium type frits* with smelted-in color. These type frits are being used in some plants and are performing well. They have been shown to be unusually color stable in the blue-green range of colors and in the medium strength colors. If a single color frit can be used, no color matching will be necessary and the mills can be loaded the same as white. However, for most colors a mixture of basic colored frits and/or mixture of basic color and white would be necessary to produce the required color. Under these conditions, the control of color from mill to mill would be very similar to the frit/oxide colors.

The oxides can be supplied by your frit supplier or by an independent supplier who specializes in manufacturing oxides for ceramic and associated uses. Any oxide supplier will be happy to submit matches for your colors or to assist you in developing acceptable colors. The supplier will incorporate into the color match all of his accumulated knowledge of oxides and mill additions to provide the most stable color.

In initiating your color work, this point should be considered: Make sure your inspection department is included in your choice of colors, if that choice is left to you, and is also present in accepting the production matches when they are made. Since inspection will be responsible for the final O.K. of colors in production, they can gain a better appreciation of your problems if they are included in the work done to match the color — both in the laboratory and in the production mills and furnace.

Confine your first work to the laboratory

Your first color work should be on a laboratory basis. The submitted match from which you will start was fired in a lab furnace. The heat treatment may or may not be a duplication of the conditions in your lab or production fire. Recognizing this, your first step should be to load lab mills of the color formula supplied with the color match. After checking the fineness of the enamel, plates should be fired both in the lab furnace and the production furnace. The plates fired through the production furnace should be given the same treatment as your ultimate production color, if possible. On the basis of these plates, a lab fire should be set up to duplicate the color and properties of the production fire. If a match cannot be made between the lab fire and the production fire, a correlation should be established so that colors produced in the laboratory furnace can be reasonably correlated to production fire. This will be necessary for your later control checks on production mills.

In this first laboratory work, as much information as possible should be obtained on the color and characteristics of the frit. Check the stability of the frit and color by firing over a temperature range of 60 to 80°, which should simulate the extreme conditions encountered in the production fire. It would also be advantageous to fire at various times at a constant temperature. These time/temperature checks with the color will help in determining what firing cycle will be best for the frit and also whether the color will be stable in the production fire.

Should your color prove to be relatively unstable over a temperature spread of 60 to 80°, go back and check your mill additions and salts to find the best combination of electrolytes for the particular frit and oxides which you are using. Auxiliary mill additions have been used in some cases where adjustment of electrolytes did not prove entirely satisfactory. No specific rules on electrolytes can be given because each frit may react differently with given oxides and mill additions.

You need not develop a perfect match in your laboratory mills or in your lab furnace. The function of your laboratory work is to learn as much about the frit and color as possible, and to develop a mill formula from which you will load the first small mill.

Next month — Part II — Production test and a list of do's and don'ts.

CRANE TO CELEBRATE 100TH ANNIVERSARY NEXT JULY 4

Crane Company will observe its centennial on July 4, 1955, just 100 years to the day after 23-year-old Richard Teller Crane opened a one-room self-built shop in Chicago, population 75,000.

The company began by supplying brass lightning rod tips to a small local market. It has grown to the point where some 40,000 Crane products are used in factories, farms, offices and homes throughout the country.

What's News for you from Pemco...

THE

* COMPATIBILITY

between Pemco Neowite 500 Series Frits
and Pemco Coloring Oxides
is the answer to . . .

1. Ease and stability of formulation

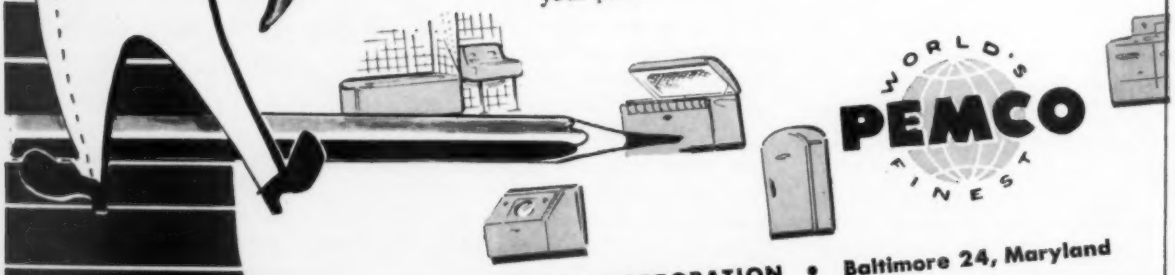
2. Color matching

3. Simplification of color runs

4. Gratifying sales results

That's the Pemco color story in a nutshell—in as few words as possible so you can remember it easily. They are the RESULTS that Pemco Neowite 500 Series frits and Pemco Coloring Oxides offer you.

If you're interested in color (and you should be) you'll talk it over with your Pemco representative. You ask the questions. You be the judge of the evidence he presents on *each* benefit . . . and . . . to check up on his (and our) claims, let him schedule a trial run in your plant.



PEMCO CORPORATION • Baltimore 24, Maryland

EKCO BUYS MCCLINTOCK

Acquisition of McClintock Mfg. Co., Los Angeles, manufacturers of food handling equipment and accessories for the meat industry, by Ekco Products Co., Chicago, was announced by B. A. Ragir, Ekco president.

MOCHEL HEADS ASTM

Norman L. Mochel, manager of metallurgical engineering, Westinghouse Electric Corp., Philadelphia, was elected president of the American Society of Testing Materials at the ASTM annual meeting held in Chicago, June 13-18.

NORGE NAMES BULL DIRECTOR OF DISTRIBUTION

Appointment of Harold Bull to the new position of director of distribution for the Norge Division of Borg-Warner Corp., Chicago, was announced by R. C. Connell, director of sales. He was formerly vice president and director of sales for Apex Rotarex Corp.

KAISER METAL PRODUCTS NAMES TWO VICE PRESIDENTS

Two new vice presidents of Kaiser Metal Products, Inc., Bristol, Pa., have been appointed by the board of directors, it was announced by S. D. Hackley, vice president and general manager.

John L. Hallett, formerly executive vice president of Kaiser Motors Corp., was named vice president — aircraft production. Paul C. Meyer, executive assistant to Hackley, was named vice president — administration.

"PRODUCT MODEL SHOP" FOR PERMAGLAS PRODUCTS

The "Product Model Shop", a new department in which the Permaglas Division of A. O. Smith Corp. will fabricate proposed new models for testing in both its water heater and home heating and air conditioning lines, was announced by Waldo W. Higgins, division chief engineer.

G. G. Newland, formerly fabricating foreman for Whirlpool Corp., La Porte, Ind., will supervise the new department.

PHILCO'S WOODS HONORED

Leslie J. Woods, vice president and director of research and engineering, Philco Corp., Philadelphia, has received an honorary degree of Doctor of Engineering from Drexel Institute of Technology. He was honored for "long service as an internationally recognized engineer in the electronics industry."

KOCH EXPANSION PROGRAM

An expansion that will triple floor space of the air conditioning and refrigeration division of George Koch Sons, Evansville, Ind., is nearing completion.

It was reported that William R. Peak, formerly Servel process engineer, is now with Koch as a project engineer.

MILLS CHIEF ENGINEER

Appointment of John H. Zauner as chief engineer was announced by A. E. Tregenza, president, Mills Industries, Inc., Chicago. He previously was chief engineer of ordnance development and production programs at Eureka-Williams.

MCQUAY EXPANSION PLANS

Roy J. Resch, president of McQuay, Inc., Minneapolis, has announced plans for a branch plant, in Grenada, Miss., which will be as large as the firm's two plants in Minneapolis and another plant in Faribault, Minn.

The plant and equipment will cost about $1,250,000, and will be designed to produce the same products now made in its other plants. McQuay products include heating and air conditioning equipment, ice makers and commercial refrigeration units.

PETERS TO PHILLIPS & BUTTORFF

It is reported that L. L. Peters is now vice president in charge of marketing for Phillips & Buttorff Mfg. Co., Nashville. He was previously general sales manager for Magic Chef.

SMITH, FORMER NORGE HEAD, NAMED TO HOOVER COMMISSION

George P. F. Smith, former president of Norge Division of Borg-Warner Corp., has accepted an assignment with the Hoover Commission as procurement task force vice chairman. He will be on leave from Borg-Warner's executive staff for the duration of his government assignment.

REINBOLT TO TRACY POST

A recent report states that Charles A. Reinbolt, Jr. has been elected a vice president of Edgewater Steel Co., Oakmont, Pa., and will be in charge of the Tracy Kitchen Division. He was previously manager of product lines for American-Standard.

WHITE JOINS BRYANT HEATER

K. T. David, director of engineering, Bryant Heater Division, Affiliated Gas Equipment, Inc., Cleveland, Ohio, has announced the appointment of Glen A. White as engineering coordinator. He had been chief research engineer for Eureka-Williams.

UNARCO NAMES BALCH, JOHNSON

Edwin E. Hokin, president, Union Asbestos & Rubber Co., Chicago, recently announced the appointments of John H. Balch as executive vice president, and Emil T. Johnson as vice president in charge of production and engineering. The company recently entered the air conditioning field.

QUIET HEET WORKS MANAGER

Louis G. Pacent, Jr., assistant to the vice president-manufacturing, Emerson Radio & Phonograph Corp., has been appointed works manager of Quiet Heet Mfg. Corp., Newark, N.J., manufacturers of air conditioners and oil burners, it was announced by John D. Small, Quiet Heet executive vice president.

YOXSIMER TO REFRIGERATION ENGR. POST AT WESTINGHOUSE

Appointment of O. H. Yoxsimer as manager of refrigeration engineering

at the new Westinghouse Electric Appliance Division plant in Columbus, Ohio, was announced by J. H. Ashbaugh, division vice president, and Milton Kalischer, manager of engineering at the firm's Springfield, Mass., plant.

Yoxsimer will be responsible for all phases of refrigerator-freezer engineering, both units and cabinets, and will report to Kalischer.

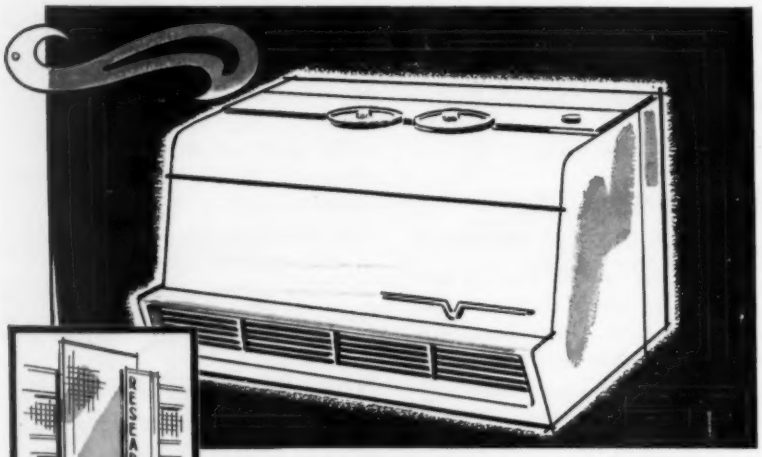
TOP DESIGN AWARDS TO DAVE CHAPMAN, LOEWY TEAM

Two top design awards of the Industrial Designers Institute were awarded recently to leading Chicago industrial designers.

Dave Chapman received one of the 1954 Design Award Medals for his work on a new line of metal school furniture designed for Brunswick-Balke-Collender Co. The medal was accepted on behalf of Chapman, who is traveling in Europe, by Kim Yamasaki, one of the partners in the firm of Dave Chapman, Industrial Design.

The second award of equal merit went to the team of Franz Wagner, Richard S. Latham and Don DeFano, of Raymond Loewy Associates, for

to make it perform **better** for **less**...



put **FIBERGLAS** to work!

The key to increased efficiency and lower operating costs for your air conditioning equipment may be versatile Fiberglas* Insulations. It's easy enough to find out! Bring your product improvement problems to the development and testing laboratories of Owens-Corning Fiberglas Corporation. Better control of heat, cold and sound with effective Fiberglas Insulations, better filtration control with Fiberglas Dust-Stop Air Filters, better design and construction with Fiberglas-reinforced plastic housings—these are but a few of many areas where Fiberglas can help you in improving air conditioning units, central heating systems and furnaces. See for yourself how many ways you can put Fiberglas to work in the new Owens-Corning booklet, "Sales Opportunities." Call the nearest Fiberglas office for your copy of this booklet, or write direct to: Owens-Corning Fiberglas Corporation, Dept. 109H, Toledo 1, Ohio.

*Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for products made of or with fibers of glass.

A Gear Motor for SMALL APPLICATIONS

Our line of small induction motors is designed for applications where small power can be converted to considerable torque at slow output shaft speed. Hundreds of thousands are in use today for operating relays, vending, amusement, coin operated machines, motion displays, combination rotisserie and broilers, etc.

These motors are made in three basic sizes—speeds from 1 to 200 r.p.m. with proportional torque from 5 to 500 in. ounces. Write today for descriptive information, prices and data sheet.

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Designers and Manufacturers of
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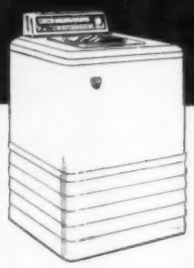

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The CUYAHOGA SPRING Co.
SUBSIDIARY OF THE BARIUM STEEL CORP
10254 BEREA ROAD • CLEVELAND 2 OHIO

their design of a "flight scale" for Borg-Erickson Corp.

Chapman authored a two-part article, "Design for Salability — A Key to Industrial Success," which appeared in the October and November, 1953, issues of *finish*.

WORTHINGTON MFG. APPTS.

Worthington Corp. has named A. M. Tullo works manager of the Harrison (N.J.) Works, and L. E. Hammer works manager of the Wellsville (N.Y.) Works. The appointments were announced by L. C. Ricketts, vice president of manufacturing.

MAGIC CHEF FOREIGN SHIPMENTS RISE 53%

Formation of Magic Chef of Canada, Ltd. climaxes an intensive expansion of export sales by Magic Chef, Inc., St. Louis, Mo. Foreign shipments increased 30% in 1953 and are up 53% over last year for the first five months of 1954, reports R. B. Matthews, export sales manager.

Leon Zakrzewski was named president of the all-Canadian organization which will direct the manufacture and sales of Magic Chef products in Canada. Headquarters will be in Toronto, Ontario.

It's Always NEW MONARCH FOR PRECISION STAMPINGS

LIGHT or HEAVY
LARGE or SMALL
DEEP or SHALLOW
SIMPLE or COMPLEX

The Quality Never Varies

From Blueprint to Shipping Carton

With a battery of presses ranging in size from one-fourth to five hundred tons, New Monarch has the right press, tooling facilities and capacity for almost every kind or size of stamping.

But that's not all! With our three modern and highly efficient plants, we are also equipped—and staffed—to supply you with complete or sub-assemblies, finishing and packing. Whether it be for a single stamping or a complete from-blueprint-to-shipping-carton job, ask New Monarch for an estimate on your work. No obligation.

NEW MONARCH MACHINE & STAMPING COMPANY
406 S. W. NINTH STREET DES MOINES 9, IOWA

CHRIST AND NOLL NAMED TO DEEPFREEZE POSTS

Appointments of H. A. Christ, Jr. as manager of purchases and Francis A. Noll as chief cabinet engineer were recently announced by the Deepfreeze Appliance Division of Motor Products Corp., North Chicago, Ill. Noll was formerly engineering department section head at Hotpoint.

Christ will continue also as planning superintendent, a post he has held since 1951. Darrell Simpson, former manager of purchases, has resigned.

FLORENCE STOVE NAMES PTACIN ADVERTISING MGR.

Joseph J. Ptacin, formerly sales promotion manager of the appliance division of Admiral Corporation, is now advertising manager of Florence Stove Company, with headquarters in Chicago.

SEAPORCEL TO FABRICATE GLASS-ALUMINUM HONEYCOMB ARCHITECTURAL SANDWICH

Seaporcel Metals, Inc., Long Island City, N.Y., manufacturers of architectural porcelain enamel, has been franchised to fabricate a new glass-aluminum honeycomb sandwich produced by Hexcel Products Co., Oakland, Calif.

The new architectural product has an aluminum honeycomb core faced on both sides by glass. It is said to be adapted to interior and exterior walls, partitions and room dividers,

The Finishing Touch

FOR THE WELL-DRESSED PRODUCT

Want details? Write us today—
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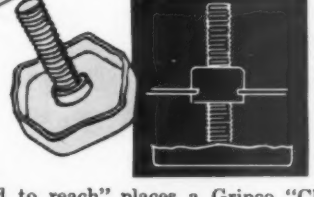
VITRO MANUFACTURING COMPANY
60 GREENWAY DRIVE, PITTSBURGH 4, PA.

FOR LOWER COST "FIXED" FASTENINGS IN BLIND ASSEMBLIES

GRIPCO "CLINCH" NUTS

This is how leading appliance manufacturers get lower cost fasteners into inaccessible places.



←Cross-Section view after pilot has been clinched and bolt inserted. Can be locked at any point. (Non-locking nut can be supplied if preferred.)

For "hard to reach" places a Gripco "Clinch" nut holds tighter, wears longer, reduces mechanical failure for greater customer satisfaction. Provides added threading depth for applying bolts to thin metals. Holds product rigid in its container during shipment and holds the adjustable "levelers" tight for product installation and use. Used by leading appliance manufacturers.

107

GRIP NUT COMPANY
"After 50 years—still holding strong"
308-Q S. MICHIGAN AVE., CHICAGO 4, ILL.

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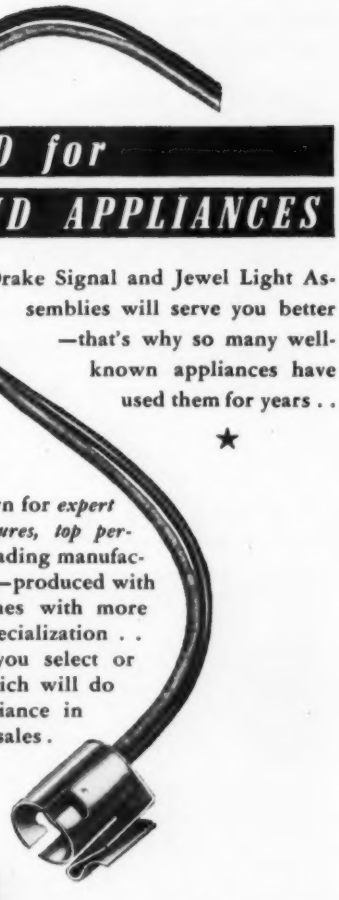

STANDARD for TOP-BRAND APPLIANCES

Drake Signal and Jewel Light Assemblies will serve you better —that's why so many well-known appliances have used them for years . .

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DRAKE

Assemblies are known for *expert design, patented features, top performance*—used by leading manufacturers in many fields—produced with the skill which comes with more than 20 years of specialization . . DRAKE can help you select or develop the unit which will do most for your appliance in both production and sales.

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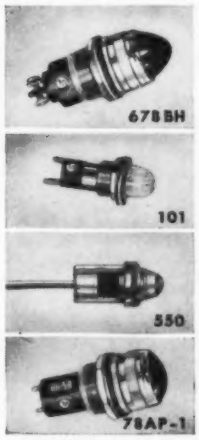
DRAKE

QUOTE ON YOUR NEEDS!



ALL KINDS OF STYLES, SIZES, COMBINATIONS..

. . are already available in the DRAKE line. It's usually easy to select from them the exact unit to fit your requirement best. But should your application need a special design, DRAKE can develop a unit especially for you . . just as we have done countless times for our customers during more than 20 years of specialization.

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SOCKET & JEWEL LIGHT ASSEMBLIES

skylights, doors, shower doors and sundeck wind baffles.

SALES OF OIL BURNERS UP WITH BUILDING CURVE

Sales of oil burners are keeping pace with new housing starts as the swing to automatic heating gathers momentum, says the Plumbing and Heating Industries Bureau. Final sales figures for 1954 are likely to equal the sale of nearly 800,000 units in 1953, the Bureau says.

NAM MOVES OFFICES

The National Association of Manufacturers has moved its offices from 14 W. 49th St. to new headquarters at 2 East 48th St., New York 17, N.Y.

NORMAN REFRIGERATION ENGR.

E. A. Norman, Jr., president of Norman Products Co., Columbus, Ohio, has announced the appointment of H. C. Schmitt as refrigeration engineer in charge of residential cooling. Formerly with Lennox Furnace, Schmitt will be in charge of field education program for the company's new winter-summer air conditioner.

DOVER OIL TANK AND SUMP

Designed WITH YOUR OIL BURNER IN MIND

The DOVER Standard Tank (flat top and bottom) is made of U. S. prime terne plate, double-seamed and soldered. Equipped with Rochester gauge, modern easy-grip handle and valve cap.

The Dover Standard Tank has a 3 gallon capacity, body diameter of 8½", and 13½" high. Available in White, synthetic enamel—baked in modern gas ovens. This prolongs its life against scratching, peeling or fading.

BACKED BY 120 YEARS OF SERVICE

The SUMP is of Standard depth. Made of heavy gauge terne plate. Equipped with brass strainer, air vent, and lighter hole. Bottom flange has ¾" standard tapered pipe thread. Finished to match tank.

For more information on an OIL TANK, designed with your Oil Burner in mind, write direct to . . .

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All Dover Tanks and Sumps are approved by the Underwriters' Laboratories, Inc., sponsored by the National Board of Fire Underwriters, and also meet the specifications of the Massachusetts Fire Marshal's office.

SERVEL CHAIRMAN NAMED AS FOUNDER OF FOREMAN GROUP

Louis Ruthenburg, chairman of Servel, Inc., Evansville, Ind., has been identified as the "founding father" of the National Association of Foremen. The first foremen's club is said to have had its start in 1918 when Ruthenburg, then manager of Delco's factory in Dayton, Ohio, saw a need to bring the plant's foremen closer together.

BOWER TO HEAD FREEZER CABINET DESIGN FOR AMANA

Amana Refrigeration, Inc., Amana, Iowa, has announced the appointment

of Warren R. Bower as head of the freezer cabinet design section of the firm's engineering department. He joined Amana in 1951.

BLOCK PREDICTS ANNUAL USE OF 200 MILLION TONS OF STEEL IN 25 YEARS

A rise in the use of steel within the next 25 years to a possible annual total of 200,000,000 tons, twice the production of any year prior to 1951, was predicted by Joseph L. Block, president of Inland Steel Co., at the annual conference of the Indiana Manufacturers Association. The meeting was held June 10 in French Lick, Indiana.

QUICFREZ NAMES CHIEF ENGR.

George J. Fleck has been appointed chief engineer of Quicfrez, Inc., Fond du Lac, Wis., it was announced by H. H. Ryan, vice president - sales.

Fleck was formerly refrigeration engineer for Coolerator for five years, and previously was with the Norge refrigeration section for eight years.

CAMPBELL, IRELAND TO NEW POSTS WITH MCGRAW ELECTRIC

D. S. Campbell, president of Toastmaster Products Division and vice

D. S. CAMPBELL

MURRAY IRELAND

president of McGraw-Electric Co., Elgin, Ill., will in the future devote his time to investigations in connection with expansion of the company, it was announced by Max McGraw, president.

Murray Ireland, in charge of Toastmaster development and production, will succeed Campbell as division president, and will be responsible for quality control in all of the firm's appliance plants.

ING-RICH GETS LARGE ARCHITECTURAL PORCELAIN ORDER FOR SCHOOL WALLS

Ingram-Richardson Mfg. Co., Beaver Falls, Pa., has received an order for 9,000 sq. ft. of architectural porcelain which it hopes will indicate the beginning of a new trend in school design.

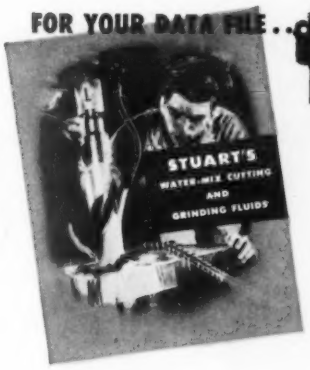
In the fall of 1952, Ing-Rich completed the installation of porcelain enameled panels for classrooms and corridors in St. John's School, Monaca, Pa.

Now the school has specified Ing-Rich "Porcelpanels" for the wall surfaces in an expansion program now underway. The material will be used in seven classrooms, two washrooms, and an office on the second floor of the school building.

BORG-WARNER CHAIRMAN DIES

Charles S. Davis, 77, chairman and formerly president of Borg-Warner Corp., died July 2 in Paris, France, while on a European tour.

FOR YOUR DATA FILE . . .



a *NEW GUIDE* to SOLUBLE OIL SELECTION

Every industrial lubricant is measured by its performance. Water-mix cutting and grinding fluids are no exception . . . it still takes the *right* oil to do the *best* job!

Stuart Oil Company's guide on water-mix cutting and grinding fluids is intended as a help when you're selecting a water-mix for the shop. It provides information and background on water-mixtures that you should know.

"The Man in the Barrel," your Stuart Representative, will be pleased to provide further information and help. Send for your book today.

DASCO

Two water-mixes built into one. Dasco Super Soluble Base is a heavy-duty water-mix cutting and grinding fluid of unusual versatility. Superior performance is provided in mixtures of 1-40 and higher for turning, milling, reaming, drilling and boring and 1-100 and higher for grinding.

KLEENKUT

A *conventional* type soluble oil to perform such jobs as light milling, turning, drilling, boring and others. Kleenkut provides something *extra* with more uniform performance, better stability, detergency, emulsibility and high anti-rust value.

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An emulsified heavy-duty cutting oil that is especially effective on the more severe applications where ordinary type soluble oils fall short of meeting tool life and finish requirements. Solvol provides a balance of cooling and lubricating value rarely equaled in a water-mix product.

CODOL

Stuart's water-mix liquid grinding compound that has been specially designed to reduce wheel loading. It provides adequate heat dissipation, anti-rust protection and a carefully balanced surface tension to carry away chips and abrasive particles.

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Please send me a copy of Stuart's Water-Mix Cutting and Grinding Fluids book.
Name .....
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☐ Please have "the Man in the Barrel" call.

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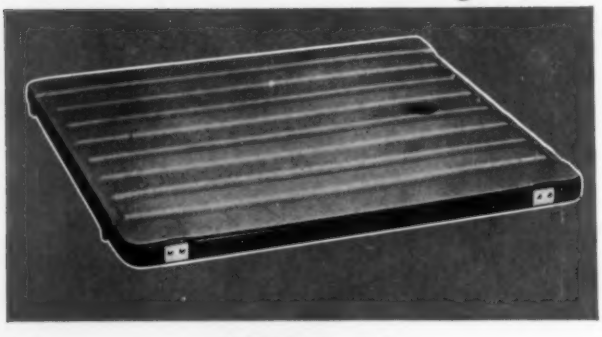
Sliding Drainboard



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- KOHLER OF KOHLER
- *Humphries*
- Briggs
- *Youngstown*

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NORGE LAUNDRY SHIPMENTS HIT ALL-TIME HIGH

June factory shipments of Norge home laundry equipment reached an all-time high, reported R. C. Connell, director of sales, Norge Division of Borg-Warner Corp.

Shipments of washers were up 206.3% over June, 1953, and 27.4% over May, 1954, he reported. Dryer shipments increased 94.8% over a year ago, and 110.2% over the May mark.

LT. GEN. WEDEMEYER TO KEY POST AT RHEEM

The election of Lt. Gen. Albert C. Wedemeyer (USA, Ret.) as vice president and director of Rheem Manufacturing Co. was announced by Richard S. Rheem, president. He will assume his new responsibilities September 1, and will make his headquarters at Rheem's New York executive offices.

General Wedemeyer resigned a similar post which he held since 1951 with Avco Mfg. Corp. He joined Avco shortly after his retirement in 1951 upon completion of 32 years of military service during which time he won recognition as one of the nation's outstanding military strategists.

RECORD WESTINGHOUSE FREEZER PROMOTION

One-half million dollars will be spent on a 60-day home freezer promotion by Westinghouse Electric Appliance Division, it was revealed by S. J. Stephenson, manager of the refrigerator-freezer department.

Spearheading the promotion, "The Freezin' Season," will be product demonstrations by Betty Furness on Westinghouse Studio One, magazine advertising which will reach 50,000,000 readers, and newspaper ads run in 130 key markets.

WALTER LINDEMANN NAMED FELLOW BY ASME

Walter J. Lindemann, of A. J. Lindemann & Hoverson Co., Milwaukee, has been elevated to the grade of Fellow of the American Society of Mechanical Engineers.

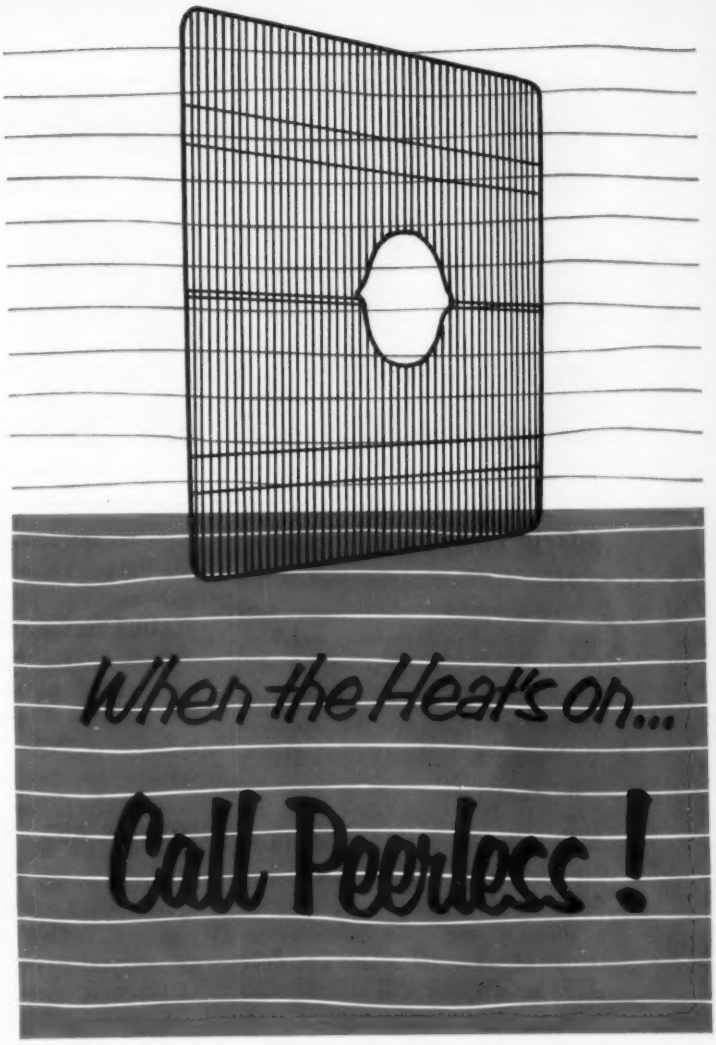
Joining Lindemann & Hoverson in 1909, he has been active in the design and manufacture of cooking and heating stoves and related appliances. He is credited with developing new generating and control devices for gasoline stoves, as well as safety shut-off equipment for gas stoves. As far back as 1910, he pioneered in the building of electric ranges. He holds 13 patents in his field. He has been active in porcelain enamel research and application methods, and is a Fellow of the American Ceramic Society.

HOTPOINT MODERNIZING HOME LAUNDRY PLANT

Hotpoint Co., Chicago, is carrying out an extensive modernization program in its home laundry manufacturing plant. The present factory, built in 1918, is being enlarged, and when completed late this year will be the most modern home laundry factory in the midwest, stated John C. Sharp, president.

An enameling furnace described as the world's largest, seven miles of overhead conveyors, and the latest in production equipment are features of the modernization program.

The porcelain enameling plant, built as an addition to the main new plant building, also features one of the largest pickling machines in the appliance industry. The new enamel plant will have twice the capacity of the old facilities, stated Sharp.



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NEWS ABOUT SUPPLIERS

ALDEN G. ROACH

WALTER G. KOCH

GEORGE STAUDT

PAUL PARDONNER

ROACH, KOCH TO AMA BOARD

Alden G. Roach, president of Columbia-Geneva Steel Division of U.S. Steel Corp., San Francisco, and Walter G. Koch, president of International Steel Co., Evansville, Ind., have been elected to the board of directors of the American Management Association.

JOHNSON TO GEAUGA INDUSTRIES

Lugh M. Johnson has joined Geauga Industries Co., Middlefield, Ohio, as a director and vice president in charge of sales. He is also a partner in Johnson Sperry Co., and is president of Sajar Plastics, both of Middlefield. He was formerly associated with Chardon Rubber Co. in a sales capacity, and before that with Johnson Rubber Co. as general manager.

STAUDT ELECTED NIAA CHAIRMAN

George L. Staudt, advertising manager, Harnischfeger Corp., Milwaukee, has been elected chairman of the board of the National Industrial Advertisers Association.

TUTTLE & KIFT NAMES REPRESENTATIVES

John R. Kauffman, general sales manager, Tuttle & Kift, Inc., Chicago, has announced the appointment of two new sales representatives.

T. J. Riley & Associates, Detroit, will represent T&K in the sales of Monotube Replacement units in southeastern Michigan. Dave Walling will continue to cover the remainder of the state of Michigan and northern Ohio.

William S. Owen Co., Syracuse, will represent T&K in the sale of Monotube Replacement units and OEM products in the state of New York, except in New York City and Long Island.

ARMCO UPS PARDONNER

Paul F. Pardonner has been named assistant manager of the Detroit sales district of Armco Steel Corp., it was announced by W. B. Quail, sales division manager. He had been a member of the Detroit sales staff for the past eight years.

CHANGE NAME TO JOMAC, INC.

C. Walker Jones Co., Philadelphia, manufacturers of loop pile fabric gloves, has changed its name to Jomac, Inc. H. Howard Colehower, president, explained that the name was changed because of widespread usage in industry of Jomac, their trade name, when referring to the company.

COWLES UPS CLABAUGH

Carl C. Clabaugh has been promoted to the newly-created position

New color calcining furnace — *at Pemco Corporation — is being discussed by M. S. Friesner, left, supervisor of quality control; J. E. Eagle, center, manager of color sales; and C. P. Lohman, general sales manager. The continuous color calcining furnace, which went into operation about July 15, is expected to help boost production of color at Pemco by about 200%.*

Appliance hardware designs — *are shown Col. Alexis de Sakhnoffsky, seated, to Herman Pleasant, left, president, and B. A. Britton, vice president of Grand Rapids Brass Co. de Sakhnoffsky has been retained by the company to consult with customers on designs and styling of hardware.*

CARL CLABAUGH

RAY F. BORST

MARTIN DUBOVY

DONALD BOULTBEE

FRANK JOHNSON

CHARLES AUGER

of sales manager of the metal cleaner department, Cowles Chemical Co., Cleveland, according to Earl F. Clark, department manager.

WHITFIELD NAMES BORST

Ray F. Borst, formerly with Bryant Heater, has been appointed as a sales and service representative for Whitfield Chemical Co., Detroit, according to C. Whitfield Smith, president. He will headquarter in Chicago.

FERRO TO CONSTRUCT FRIT FACTORY IN SOUTH AFRICA

Harry T. Marks, administrative vice president, Ferro Corp., Cleveland, has announced that Ferro Enamels (Proprietary) Ltd. (Ferro-South Africa), will undertake construction of a frit-producing factory in Brakpan, Transvaal, South Africa. W. Massey, formerly of Ferro-England, will be the new managing director of Ferro-South Africa.

BOULTBEE, DUBOVY TO ING-RICH

Ray Coin, president of Ingram-Richardson, Inc., Frankfort, Ind., reports the addition of Donald Boultbee to the research laboratory staff, and Martin P. DuBovy to the frit division.

Boultbee previously worked for Kaiser Metal Products and General Electric. He recently served as 1st Lieutenant with the U.S. Army Engineer Corps in Germany. DuBovy was previously with A. F. Thompson Co., and served six years in the U.S. Air Force and U.S. Army.

METALWASH UPS AUGER, JOHNSON

Metalwash Machinery Corp., Elizabeth, N.J., has named Charles J. Auger sales representative in Michigan, and Frank J. Johnson representative in metropolitan New York and northern New Jersey.

GRIGOLEIT APPOINTS MCMINN

The Grigoleit Co., Decatur, Ill., has announced the appointment of A. P. McMinn as sales representative in the territory consisting of Illinois, Indiana, and St. Louis County, Mo. Since joining the firm in 1945, McMinn has been purchasing agent.

RUTLEDGE, WEISSENBERGER TO FERROD MFG. POSTS

C. D. Clawson, president of Ferrod Mfg. Co., Batavia, Ill., producer of rod-type heating units for appliances and other products, has announced the appointments of E. B. Rutledge as acting treasurer and E. G. Weissenberger as sales manager.

Before joining Ferrod, Rutledge was assistant to the president of Tuttle & Kift, Inc., Chicago. Weissenberger was formerly associated with A. T. Kearney & Co., management consultants, Majestic Radio, and General Electric. Both Ferrod and Tuttle & Kift are subsidiaries of Ferro Corp., Cleveland, of which Clawson is also president.

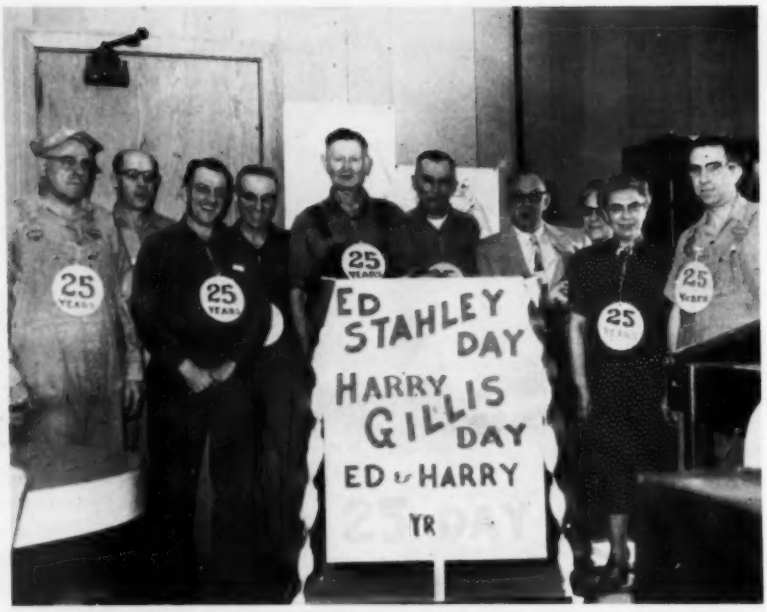
HOTCHKISS TO VITRO POST

Eugene B. Hotchkiss has been named a vice president of Vitro Corp. of America, according to J. Carlton Ward, Jr., president. Hotchkiss is also chairman of Cro-Plate Co, Inc., treasurer of Vibro Dynamic Engineering, Inc., and a director of Kaman Aircraft Corp.

GRAND RAPIDS VARNISH APPTS.

Joseph A. Hager, vice president and sales director, Grand Rapids Varnish Corp., has announced the ap-

At power brake and die show — *held recently at Airtherm Mfg. Co., St. Louis — the firm displayed its "Metalworker" brakes and dies, along with its sheet metal products, including heating equipment, roof decking, and tanks. F. P. Kohlbry, president, said the interest displayed would lead to similar shows in the future.*



***Vitreous Steel Products' 25-year club** — met recently at the company's Nappanee, Indiana, plant. The total years of service represented by this group is 280. Left to right are Wilbur Lehman, Hubert Hartman, Harry Gillis, Elden Scrock, Clarence Brumbaugh, Willis E. Stahley, Harold B. Gray, vice president, Edith Cleveland, Violet Swihart and Albert Jensen. Four men at the firm's Cleveland offices, also members of the club, are Edgar H. Weil, president; Brainerd Dyer, vice president; George H. Hays, secretary; and Arthur R. Leyerle, technical service engineer. Each new member is presented with an appropriately engraved wrist watch.*

pointments of Robert W. Spence as representative in the northern Indiana-Illinois area, and Robert M. Eastwood in the Detroit and eastern Michigan area.

UNION STEEL PRODUCING PORTABLE "CHUCKWAGON"

W. C. Neumann, sales manager, Union Steel Products Co., Albion, Mich., has announced the manufacture of a portable, folding yard-type grill known as the "Chuckwagon."

Another new development in the company's expanding line of indoor-outdoor equipment is their "Hi-Lo" Junior economy grill which is designed with folding reinforced legs, and close-meshed grill.

FERRO REPORTS ON CHILEAN, AUSTRALIAN AFFILIATES

R. A. Weaver, chairman, Ferro Corp., has announced further expansion of Ferro Enamels (Australia) Ptdy. Ltd., with the purchase of another factory building in the vicinity of Sidney.

Weaver also announced that Ferro Enamel de Chile-Esmaltes Para Enlozer-Ltda (newest foreign affiliate) is now in full-scale production.

TOLL HEADS CLEVELAND AD CLUB

Carl F. Toll, general manager of advertising and publicity for The Sherwin-Williams Co., is the new president of the Cleveland Advertising Club.

ADJUST STEEL PRICES UPWARD

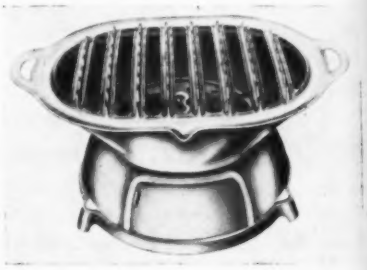
U.S. Steel Corp. has announced an upward adjustment in steel prices equal to 2½%, or approximating $3 per ton. Clifford F. Hood, president, said the new prices were made necessary because of increased production costs resulting from a recent wage increase.

G-E COORDINATES SERVICE FOR MIDWEST CUSTOMERS

A new combined manufacturing and selling operation to give more direct service to customers in the midwest has been established in Milwaukee by the industry control department of General Electric Co. L. J. Geiger was appointed manager of Milwaukee sales, and W. B. Lynn was named manager of engineering and manufacturing.

PRIZER-PAINTER INTRODUCES COLORED CAST IRON WARE

For several years, enameled cast iron ware in colors has been imported into this country from Europe. Now several American companies have entered this business, including The Prizer-Painter Stove Works, Inc., Reading, Pa.



Above is shown a charcoal grill, and below is a folding food warmer. L. E. Bilger, president, said that their line is moving exceptionally well nationwide.